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The impact of Protection Motivation Theory grounded messaging on diabetes prevention behaviours following Gestational Diabetes

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A thesis submitted in partial fulfillment of the requirements for the degree in Master of Science

THE IMPACT OF PROTECTION MOTIVATION THEORY GROUNDED MESSAGING ON DIABETES PREVENTION BEHAVIOURS FOLLOWING GESTATIONAL DIABETES

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Abstract

Women diagnosed with Gestational Diabetes (GDM) are more likely to develop Type 2 Diabetes (T2DM). Despite this risk, few women are engaging in diabetes prevention behaviours. **Methods:** The Protection Motivation Theory (PMT) was employed to design and evaluate a post-GDM diabetes prevention information session. The utility of this theory in predicting intentions and diabetes prevention behaviours was assessed using regression analysis. **Results:** Two of the four PMT variables, response efficacy and self efficacy were found to be consistent predictors of intention across most of the recommended behaviours, accounting for between 25% and 77% of the variance in intention. Intention was a less robust predictor of behaviour in this study than observed in the majority of PMT research. **Conclusion:** The results of this study support the use of diabetes prevention interventions that build self efficacy and help bridge the apparent intention-behaviour gap in women with a recent history of GDM.

Keywords

Gestational Diabetes, Type 2 Diabetes prevention, Protection Motivation Theory, health psychology

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Table of Contents

List of Tables

List of Figures

List of Appendices

List of Abbreviations

A1c: Glycated hemoglobin

BMI: Body Mass Index

DPP: Diabetes Prevention Program

g: Grams

GDM: Gestational Diabetes

GLTEQ: Godin Leisure-Time Exercise Questionnaire

kg/m^2: Kilograms per meters squared

m: Meter

METS: Metabolic Equivalent of Task

n: number of participants in respective group

N: total number of participants

PCOS: Polycystic Ovary Syndrome

pGDM: previous Gestational Diabetes

PMT: Protection Motivation Theory

PS: Perceived Severity

PV: Perceived Vulnerability

Q1: Questionnaire #1 (pregnancy/baseline measures)

Q2: Questionnaire #2 (PMT measures for attendees pre-test)

Q3a: Questionnaire #3a (PMT measures for attendees)

Q3b: Questionnaires #3b (PMT measures for non-attendees)

RE: Response Efficacy

SE: Self-Efficacy

SJHC: St. Joseph's Health Care

SSB: Sugar Sweetened Beverages

T2DM: Type 2 Diabetes

UWO: The University of Western Ontario

Chapter 1

1. Introduction

Women who develop gestational diabetes (GDM) during pregnancy are significantly more likely to develop type 2 diabetes (T2DM) compared to women who did not develop GDM during their pregnancies (Bellamy, Casas, Hingorani, & Williams, 2009). Despite this increased risk, relatively few women with previous GDM (pGDM) are engaging in diabetes prevention behaviours, such as consuming an adequate amount of vegetables (Kieffer, Sinco, & Kim, 2006; Zehle et al., 2008), engaging in sufficient physical activity (Smith, Cheung, Bauman, Zehle, & McLean, 2005), and achieving and maintaining a healthy body weight (Kim, McEwan, Kieffer, Herman, & Piette, 2008).

Several barriers to engaging in these behaviours have been proposed, including inaccurately low risk perception (Kim, McEwan, Piette, Goeway, Ferrara, & Walker, 2007a; Malcolm, Lawson, Gaboury, & Keely, 2009; Morrison, Lowe, & Collins, 2010) and low self efficacy, particularly when tired, short on time, or when behaviours are not well supported by family members (Kim et al., 2008; Smith et al., 2005; Symons Downs and Ulbrecht, 2006; Zehle et al., 2008).

According to the Protection Motivation Theory (PMT), intention to engage in risk reduction behaviours depends on four main constructs. These constructs include perceived vulnerability to the threat (PV), perceived severity of the threat (PS), the perceived effectiveness of the recommended preventative behaviour (response efficacy, RE), and perceived self efficacy to perform the behaviour (SE) (Maddux and Rogers, 1983). Interventions based on PMT have been effective in motivating a variety of groups (e.g., students, middle aged men and women) to engage in health behaviours (Milne, Sheeran, & Orbell, 2000); however, the effectiveness of PMT grounded messaging has not yet been investigated in this population.

Seeking to increase patients' motivation to engage in diabetes prevention behaviours following GDM, professionals at the Endocrine and Pregnancy clinic at St. Joseph's

Health Care (SJHC) in London, Ontario developed a one hour, PMT-grounded information session to offer patients following their pregnancy.

The purpose of this research was to examine the usefulness of this information session and to assess the utility of the PMT model in predicting diabetes prevention behaviours and intention to engage in these behaviours within this population. The results of this research will also help guide the design of future diabetes prevention interventions for women with a pGDM.

1.1 Objectives

The primary objectives of this research were to:

- evaluate the effectiveness of the information session by assessing its impact on the PMT constructs (PV, PS, RE, SE), intention to engage in diabetes prevention behaviours, and the behaviours themselves;
- assess the utility of the PMT model in predicting intention to engage in diabetes prevention behaviours and the behaviours themselves.

The secondary objectives of this research were to:

- identify other demographic and lifestyle factors associated with the PMT constructs, intentions, and diabetes prevention behaviours; and
- identify potential barriers to attending the information session.

1.2 Hypotheses

The hypotheses of this research project were that:

- women who attend the information session will score higher on PMT constructs (PV, PS, RE, SE), intention to engage in diabetes prevention behaviours, and, potentially, the behaviours themselves;

- the PMT constructs (PV, PS, RE, SE) will predict intention to engage in diabetes prevention behaviours, which should in turn predict concurrent behaviours;

- perceived vulnerability (PV) will be positively correlated to family history of diabetes, total number of T2DM risk factors, and possession of the strongest risk factors for T2DM in this population (i.e., insulin use during pregnancy, pre-pregnancy overweight and obesity, being less than 24 weeks gestation at time of GDM diagnosis, and GDM diagnosis during previous pregnancies);
- perceived severity (PS) will be positively correlated to level of education, family history of T2DM, and insulin use during pregnancy;
- response efficacy (RE) will be positively correlated to level of education, and perceived helpfulness of related diet and physical activity behaviours that were recommended to help manage blood glucose levels during pregnancy;
- self efficacy (SE) will be positively correlated to education level, household income, ability to perform related behaviours during pregnancy, and negatively correlated to number of dependent children;
- barriers to attending the information session will likely include lack of time due to competing demands related to parenthood.

Chapter 2

2. Literature Review

The prevalence of GDM, defined as carbohydrate intolerance with first onset or recognition in pregnancy (IDF Clinical Guideline Task Force, 2009), is on the rise both locally (Davenport, Campbell, & Mottola, 2010) and internationally (Ferrara, 2007). While this condition generally resolves shortly after the affected pregnancy, both the woman and her offspring are at an increased risk for developing overt diabetes later in life (IDF Clinical Guideline Task Force, 2009). Despite this increased risk, few women are engaging in diabetes prevention behaviours (Jones, Roche, & Appel, 2009). Researchers attribute this disparity, at least in part, to low risk perceptions and other counter productive health beliefs that are affecting women's motivation to engage in these risk reduction behaviours (Jones et al., 2009). Accordingly, research that focuses on better understanding what motivates women to engage in diabetes prevention behaviours following GDM should be a public health priority.

2.1 Risk of type 2 diabetes and recurrent gestational diabetes

In a recent meta-analysis, Bellamy and colleagues reported that women diagnosed with GDM were about seven times more likely to develop T2DM compared to women who were not diagnosed (Bellamy, Casas, Hingorani, & Williams, 2009). However, the largest study in this meta-analysis reported a relative risk of 12.6 (Feig, Zingman, Wang, & Hux, 2008). This Canadian retrospective study found that approximately one in five women who were diagnosed with GDM developed T2DM in the nine year follow-up period. Developing T2DM following GDM seems to be more common among those who had a greater weight prior to pregnancy, used insulin to manage their blood sugars during pregnancy, or who were diagnosed with GDM before 24 weeks gestation (Baptiste-Roberts et al., 2009).

Recurrence rates for GDM vary from 30-84% according to the most recent systematic review by Kim and colleagues (2007b). While less is known about leading risk factors for GDM, weight gained between pregnancies appears to be a significant risk factor for GDM recurrence. In a study conducted by Ehrlich et al. (2011), women who developed recurrent GDM gained significantly more BMI units (mean = 2.0 kg/m²) between pregnancies compared to those who did not develop GDM (mean = .66 kg/m²). Still, the most powerful risk factor for recurring GDM is likely the number of previous GDM diagnoses. According to Getahun and colleagues, adjusted rates for developing recurrent GDM is 13 fold with one previous GDM diagnosis and 26 fold with two previous GDM diagnoses (Getahun, Fassett, & Jacobson, 2010).

Offspring who were exposed to GDM in utero may also be at higher risk of developing T2DM. Several studies have linked maternal GDM to offspring overweight and obesity, a major risk factor for developing T2DM (Gillman, Rifas-Shiman, Berkey, Field, & Colditz, 2003; Hillier et al., 2007; Wright et al. 2009). However, more recently, Chadler-Laney et al. (2012) found that offspring may be at a higher risk for developing T2DM regardless of BMI. In this study, exposure to GDM in utero was associated with greater static insulin secretion and central adiposity that was independent of BMI. Accordingly, GDM may play a significant role in the intergenerational cycle of diabetes. Finding ways to effectively prevent both T2DM and GDM recurrence in this high risk population is urgently needed to reduce the burden of diabetes on future generations.

2.2 Known and suspected diabetes prevention behaviours

2.2.1 Consuming a healthy breakfast

Both breakfast frequency and quality may play an important role in diabetes prevention. To date, the majority of cross-sectional and prospective studies in this area have independently associated breakfast consumption with lower BMI in adults (Timlin and Pereira, 2007; McCrory and Campbell, 2011). In addition to potentially reducing risk for overweight and obesity, regular consumption of breakfast has been associated with reduced rates of other diabetes risk factors. In a large cross sectional study, young adults

(20-39 years old) who consumed ready-to-eat breakfast cereals were significantly less likely to develop abdominal obesity and elevated insulin levels compared to those who skipped breakfast (Deshmukh, Nichlas, Radcliffe, O'Neil, & Liu, 2012). Further, a recently published prospective epidemiological study found that men who ate breakfast were 21% less likely to develop T2DM compared to those who skipped breakfast (Mekary, Giovannucci, Willett, Dam, & Hu, 2012).

There are several potential mechanisms that may be contributing to the observed diabetes risk reduction. Firstly, food consumed in the morning is particularly satiating potentially leading to reduced total daily energy intake (de Castro, 2007). Secondly, the longer the evening fast is prolonged the higher the ghrelin concentrations rise, which may lead to overeating if the first meal is postponed until later in the day (Cummings et al., 2001). Lastly, breakfasts, particularly those that are high in fibre or low in glycemic load, can improve insulin sensitivity and reduce between meal hypoglycemia (Pereira et al., 2011; Farshchi, Taylor, & MacDonald, 2005) allowing the individual to better manage their appetite throughout the day.

2.2.2 Consuming a diet rich in vegetables and fruit

A diet rich in deeply colored vegetables and fruit, particularly dark leafy green vegetables, may also reduce the risk of developing T2DM. In a recent meta-analysis of prospective cohort studies, an increase of 1.15 servings a day of dark leafy green vegetables was associated with a 14% reduced risk of developing T2DM (Carter, Gray, Troughton, Khunti, & Davies, 2010). While not statistically significant, Carter et al. (2010) observed a trend toward reduced T2DM incidence with consumption of greater quantities of vegetables and fruit. A large prospective study published after this review found that quantity of vegetables, but not quantity of fruit, was inversely associated with T2DM risk (Hazard Ratio (HR) = .76) (Cooper et al., 2011). Cooper and colleagues also reported that greater varieties of fruit, vegetables, and combined fruit and vegetables were correlated with reduced risk of T2DM (HR .70, .77, .61 respectively), regardless of total number of servings. The benefits of vegetables and fruits are likely due to their high

fibre, antioxidant, and mineral content paired with their low energy content (Carter et al., 2010).

In summary, the evidence to-date suggests regular consumption of dark leafy greens (one to two servings per day) may reduce the risk of T2DM. Total vegetable consumption and variety of fruit and vegetables also appear to be protective against T2DM. These findings are in line with public health messaging from *Eating Well with Canada's Food Guide* (Health Canada, 2007). In this document, Health Canada recommends seven to eight servings of vegetables and fruit each day for women 19-50 years old and specifically encourages Canadians to eat at least one dark green and one orange vegetable each day.

2.2.3 Avoiding sugar sweetened beverages

Avoidance of sugar sweetened beverages (SSB) is another recommended behaviour for the prevention of T2DM. Not only have prospective epidemiological studies consistently found positive associations between SSB intake and weight gain or obesity (Malik, Schulz, & Hu, 2006), a meta-analysis has recently made a link between SSB and T2DM that is independent of weight gain (Malik et al., 2010). In this meta-analysis of prospective co-hort studies, Malik and colleagues reported that individuals in the highest quantile of SSB intake (one to two servings per day) had a 26% higher risk of developing T2DM than those in the lowest quantile (none or less than one serving per month).

The high sugar and liquid calorie content are believed to drive this association. As de Graaf (2011) explained at a recent Nutrition Society meeting, liquid calories have low satiating value compared to solid foods, which leads to incomplete compensation for total energy intake at subsequent meals. The high content of rapidly absorbed carbohydrate (i.e. added sugars) in SSB may also increase the glycemic load of the diet, leading to insulin resistance, pancreatic beta cell dysfunction, and inflammation when consumed regularly (Malik et al., 2010). Schultz et al. (2004) found that a diet high in rapidly absorbed carbohydrates, such as those found in SSB, is associated with an increased risk of T2DM in younger and middle age women. In a prospective sub analysis of the Nurses Health Study II, Pan and colleagues (2012) estimated that replacing one serving of SSB

per day with one cup of water could reduce T2DM risk by 7% in young and middle age women. Accordingly, while SSB intake should be avoided, women at risk for diabetes may benefit from even modest decreases in their SSB consumption.

2.2.4 Replacing refined grains with whole grains

Whole grains have been consistently linked with reduced risk for developing T2DM. In a Cochrane review of prospective studies, Preibe and colleagues (2009) reported a reduction in T2DM with high intakes of whole grain foods (27-30% reduced risk) and high intakes of cereal fibre (28-37% reduced risk). A more recent meta-analysis, found that individuals consuming 48-80 g of whole grain products had a 26% reduced risk of T2DM compared to those who never or rarely consumed whole grains (Ye, Chacko, Chou, Kugizaki, & Liu, 2012). Ye and colleagues also reported that among randomized control trials, fasting glucose concentrations were significantly lower in the whole grain intervention group than the control. While the potential mechanisms responsible for the effects of whole grains on T2DM risk are not fully understood, researchers suspect that whole grains' lower glycemic index and high magnesium and cereal fibre content play important roles (Lattimer and Haub, 2010). Replacing refined grains with whole grains is also supported by Canada's Food Guide (Health Canada, 2007), which encourages Canadians to make at least half their grain products whole grain.

2.2.5 Replacing trans fat and saturated fat with unsaturated fat

While total fat intake may not significantly influence T2DM risk (Riserus, Willet, & Hu, 2009; Salas-Salvado, Martinez-Gonzalez, Bullo, & Ros, 2011), the types of fats in an individual's diet appear to play a role in glucose metabolism. In particular, replacing saturated fats with polyunsaturated n-6 fats and monounsaturated fats has consistently proven to be effective in improving insulin sensitivity in clinical trials (Riserus et al., 2009; Salas-Salvado et al., 2011).

While several epidemiological studies support a positive relationship between trans fats and T2DM (Thomson, Minehane, & Williams, 2011), clinical studies have yet to show that trans fat intake results in significant changes in glucose or insulin concentrations,

especially when consumed at levels that are typical of the Western diet (Aronis, Khan, & Mantazoros, 2012). Nevertheless, the adverse effects of trans fat on cardiovascular health are well-established (Aronis et al., 2012; Erkkila, de Mello, Riserus, Laaksonen, 2008), and as such, trans fats, particularly those artificially produced by partial hydrogenation, should be limited. The evidence directly linking saturated fats with T2DM is also inconclusive (Riserus et al., 2009; Salas-Salvado et al., 2011). However, in light of a recent meta-analysis (Pan et al., 2011) linking red meat, particularly processed meat, with T2DM risk, providing dietary guidance to replace some animal-based fats (mostly saturated) with plant based-fats (mostly unsaturated) seems justified.

2.2.6 Engaging in moderate physical activity regularly

While healthful dietary behaviours help reduce T2DM risk, as illustrated above, exercise is likely the single most effective diabetes prevention behaviour. According to Sanz and colleagues, the available evidence linking physical activity to diabetes prevention is "strong and unequivocal" (Sanz, Gautier, & Hanaire, 2010). Their meta-analysis found that most of the large lifestyle intervention trials published to-date have proven physical activity to be protective against T2DM, even independent of weight loss. For example, participants in the Diabetes Prevention Program (DPP) who did not achieve the weight loss goal at one year, but did accomplish the physical activity goal (150 minutes per week) still achieved a 44% reduced risk for developing T2DM (Hamman et al., 2006). Similar results were reported by the Finnish Diabetes Prevention study, whose authors found that increases in moderate to vigorous leisure time physical activity resulted in a 49% reduction in T2DM risk, even after adjustment for BMI and changes in diet (i.e. energy, total fat, saturated fat, fibre) (Laaksonen et al., 2005).

Results from the EPIC-InterAct project (The InterAct Consortium, 2012), a large case-cohort study, further supports the role of physical activity in T2DM prevention. In this study, one category difference in physical activity (equivalent to 365 kJ/day of energy expenditure) was independently associated with a 7% relative risk reduction for T2DM among women. Consistent with previous research, lower levels of physical activity were associated with increased T2DM risk among all BMI categories. Comparing active to

inactive women, abdominally lean active women were 57% less likely to develop T2DM and obese active women were 19% less likely to develop T2DM.

Physical activity before pregnancy may also reduce the risk for GDM according to a recent meta-analysis. In this meta-analysis, women with the highest levels of physical activity prior to pregnancy were 55% less likely to develop GDM compared to women with the lowest levels of physical activity (Tobias, Zhang, Dam, Bowers & Hu, 2011). Thus, engaging in physical activity regularly may help protect women from both T2DM and recurring GDM.

2.3 Body weight and diabetes risk

Elevated body mass is a leading cause of T2DM. A meta-analysis looking at risk factors for T2DM following GDM reported that there was substantial and consistent evidence to support that anthropometric measures of obesity were positively related to T2DM risk (Baptiste-Roberts et al., 2009). Further, relatively small weight gain (approximately 0.7-1.2 kg/m² per decade) was associated with the two fold increased risk of developing T2DM compared to those who stayed a stable weight in the Nurses Health Study (Colditz, Willett, Rotnitzky, & Manson, 1995). In another large prospective cohort study, Oguma and colleagues found that weight gain, even among relatively lean individuals, can increase diabetes risk. Among lean subjects with a BMI of < 21 kg/m², modest BMI gains of greater than 1 kg/m² were associated with a relative risk of developing T2DM that ranged from 1.93(>1.0-1.5 kg/m²) to 7.68 (>3 kg/m²_, compared to subjects who did not experience significant weight change (± 0.5 kg/m²) over the 27 year follow-up period, (Oguma, Sesso, Paffenbarger, & Lee, 2005).

Conversely, weight loss, including modest weight loss, has been associated with reduced diabetes risk. In the Diabetes Prevention Program (DPP), researchers estimated that a 5 kg weight loss (5-7% of an individual's body weight who weighs 68 to 71 kg) resulted in a 55% risk reduction for developing T2DM over the 3.2 year follow-up period (Hamman et al., 2006). This estimate is also in-line with the findings of the Finnish Diabetes Prevention study group, who found that the odds ratio for subjects in the intervention

group who lost more than 5% of their body weight by year one was 0.3 compared to those in the intervention group who lost less weight or none at all (Tuomilehto et al., 2001). According to these studies, achieving and maintaining pre-pregnancy body weight and, if overweight, losing an additional 5-7% of body weight are logical preventative measures for this population.

2.4 Special considerations for women with a recent history of gestational diabetes

Despite the benefits of the lifestyle modifications listed above, few women are engaging in these behaviours following their GDM-affected pregnancies. In fact, Swan and colleagues reported that 43% of the participants in their study were not engaged in any diabetes prevention behaviours, including weight management (Swan, Kilmartin, & Liaw, 2007). The research to-date suggests that suboptimal engagement in diabetes prevention behaviours may be the result of counterproductive health beliefs, including low self efficacy and inaccurate risk perception.

2.4.1 Suboptimal engagement in diabetes prevention behaviours

Inadequate physical activity and poor dietary practices are prevalent in this population. Various studies imply that the diets of women with pGDM are not generally conducive to T2DM prevention. Most research in this area has specifically focused on vegetable and fruit intake, of which less than one third of women are consuming five or more servings a day (Kieffer et al., 2006; Kim et al., 2007a; Zehle et al., 2008). Zehle and colleagues (2006) also reported dietary behaviours which may be associated with higher intake of saturated fat and potentially trans fat. Half of the participants in this study drank full fat milk regularly and more than a quarter of the participants consumed fried food at least twice per week.

While little else is known about post partum dietary behaviors in this population, Fehler and colleagues found that positive dietary changes made during pregnancy are rarely maintained by six months postpartum (Fehler, Kennedy, McCarger, Bell, & Ryan, 2007).

Accordingly, preconception dietary behaviours may be an accurate reflection of dietary intake following pregnancy. If this is true, then the majority of women with pGDM may be consuming more than one serving SSB per week and suboptimal amounts of cereal fibre, as these behaviours were observed in women prior to the pregnancy in which they developed GDM (Chen, Hu, Yeung, Willett, & Zhang, 2009; Zhang, Liu, Solomon, & Hu, 2006).

Rates of physical activity are also suboptimal in this population. In a recent meta-analysis of research studies that examined post-GDM health behaviours, Jones and colleagues (2009) found that most studies reported that less than half of women with pGDM were meeting physical activity guidelines (Symons Down and Ulbrecht, 2006; Smith et al., 2005; Kieffer et al., 2006). In addition, Kieffer et al. (2006) found that, despite increased risk for T2DM, women with pGDM were no more likely to have increased their physical activity following pregnancy compared to women who did not develop GDM.

With suboptimal dietary practices and low levels of physical activity it is not surprising that many women with pGDM struggle to lose weight following their pregnancy. In particular, women who enter pregnancy overweight or obese will often retain some of the weight gained during their pregnancy (Giroux, Lander, Charlesworth, & Motolla, 2009; Vesco et al., 2009) and will remain either overweight or obese following their pregnancy (Jones et al., 2009). Jones and colleagues (2009) reported that the mean BMI of participants in each of the six studies included in their meta-analysis were classified as either overweight or obese. The high prevalence of overweight and obesity among women with pGDM, in addition to poor dietary habits and suboptimal physical activity levels, suggest that the potential for T2DM prevention in this population is substantial.

2.4.2 Counterproductive health beliefs

Most researchers agree that women with a history of GDM are generally well informed about their risk factors for developing T2DM and about many of the behaviours that can reduce their risk (Jones et al., 2009; Rivas, 2010). However, women's perception of their

personal risk is typically inaccurately low and many possess other counterproductive health beliefs, such as low self efficacy in performing diabetes risk reduction behaviours.

Few women with a history of GDM perceive themselves to be at an increased risk for developing T2DM even though the majority of these women recognize GDM as a risk factor for T2DM (Kim et al., 2007a) and can accurately identify most other risk factors for T2DM (Rivas, 2010). Recent studies suggest that only 16-35% of women with pGDM perceive themselves to be at an elevated risk for developing T2DM (Kim et al., 2007a; Malcolm et al., 2009; Morrison et al., 2010). This inaccurately low risk perception is concerning because risk perception is a precursor to prevention behaviours (Jones et al., 2009). Risk perception alone, however, is unlikely sufficient to change lifestyle behaviours in this population, as suggested by Kim and colleagues (2007a) who found neither leisure-time activity or fruit and vegetable consumption was significantly associated with risk perception. Accordingly, other factors are likely at play in determining which of these women engage in diabetes prevention behaviours and which do not.

Among other health beliefs, self-efficacy has been the most extensively researched in this population. Self efficacy for diabetes prevention behaviours, such as vegetable and fruit consumption and physical activity, is generally low in this population (Smith et al., 2005; Zehle et al., 2008). This is concerning considering that self-efficacy is a significant predictor of both dietary and physical activity risk reduction behaviours in women with pGDM (Smith et al., 2005; Zehle et al., 2008; Kim et al., 2007a).

Less is known about how perceptions about the severity of T2DM affect intentions to engage in diabetes prevention behaviours in this unique group of women. Research investigating women's perceptions about the effectiveness of diet and exercise behaviours in reducing risk of diabetes is also limited. However, Symons Downs and Ulbrecht (2006) found that less than 10% of women with a history of GDM believed that physical activity, a proven diabetes prevention behaviour, could reduce their risk of developing T2DM. In summary, while women with pGDM are generally well informed about T2DM risk factors and basic strategies to reduce the risk of developing T2DM

during pregnancy, few women are internalizing this risk or feel confident in their ability to perform diabetes prevention behaviours.

Further, as mothers of a young child or children, women with pGDM face other unique barriers to engaging in diabetes prevention behaviours. In addition to common determinants of health-related behaviour change, such as time, money, or facilities, many women may also feel constrained by an "ethic of care", which Miller and Brown (2007) describe as a woman's lack of entitlement to leisure, causing her to provide for the needs of others before her own. The time restraints associated with being the primary caregiver likely play a significant role in these women's ability to engage in diabetes prevention behaviors. Low levels of social support for both diet and physical activity behaviours were also reported by the majority of women with pGDM in one study (Smith et al., 2005; Zehle et al., 2008). Smith et al. (2005) reported that over half of the women with pGDM reported never receiving assistance with housework in order to have time to exercise. These distinctive challenges faced by mothers of young children, in addition to their commonly held health beliefs, should be considered when designing effective T2DM prevention interventions for this population.

2.5 Lifestyle-based diabetes prevention interventions trialed in this population

The efficacy trials conducted to-date provide strong evidence that lifestyle interventions help prevent T2DM in high risk populations (Gillett et al., 2012). The largest of these lifestyle intervention trials, the DPP, is the only large trial that concertedly recruited women with pGDM and published a sub-analysis of their results (Ratner et al., 2008). This lifestyle intervention included regular in-person consultations with medical professionals designed to help participants achieve and maintain 7% weight loss and 150 minutes or more per week of moderate intensity physical activity. Women with pGDM who were in the lifestyle intervention group experienced a 53% T2DM risk reduction compared to women with pGDM in the control group. Women with pGDM in the intervention group, however, were less likely to achieve and maintain weight loss or physical activity goals compared to women in the intervention who did not develop GDM

during their pregnancies (Ratner et al., 2008), suggesting that general T2DM prevention lifestyle interventions may not fully meet the needs of women who have a history of GDM.

It is possible that this program may have been more effective if initiated closer to GDM diagnosis when woman are generally motivated to protect the health of their unborn child and are facing the realities of managing elevated blood glucose (Ferrara et al., 2011). However, diabetes prevention information provided during pregnancy alone is likely insufficient to produce lasting change, as suggested by a Danish study. In this study, Stage and colleagues (2004) found that despite informing patients about their future risk of developing overt diabetes and providing lifestyle and weight management recommendations to reduce this risk, exercise levels did not change after pregnancy and only 18% of overweight women lost the recommended amount of weight when surveyed one to four years following delivery.

Extending a one-on-one, health professional-led intervention from pregnancy into the early postpartum period may also be inadequate to significantly decrease weight or increase physical activity behaviours as suggested by a more recent DPP-based intervention (Ferrara et al., 2011). The intervention condition in this study began in pregnancy and extended until 12 months postpartum. While the intervention successfully decreased dietary fat intake more than usual care, there were no significant differences in the proportion of overweight women who reached the postpartum weight loss goal (i.e., 5% reduction in pre-pregnancy body weight, if overweight) between the intervention and control groups. There were also no differences in physical activity observed between the two conditions.

In the intervention conducted by Ferrara and colleagues (2011), participants were given the DPP handbook that contained written materials for the six to fourteen telephone counselling sessions and two in person sessions. These sessions were led by a Registered Dietitian who encouraged 150 minutes of physical activity per week and to consume 25% or less total calories from fat per day. Dietitian recommendations for each participant

were tailored based on diet and physical activity assessments and weekly self-monitoring diaries.

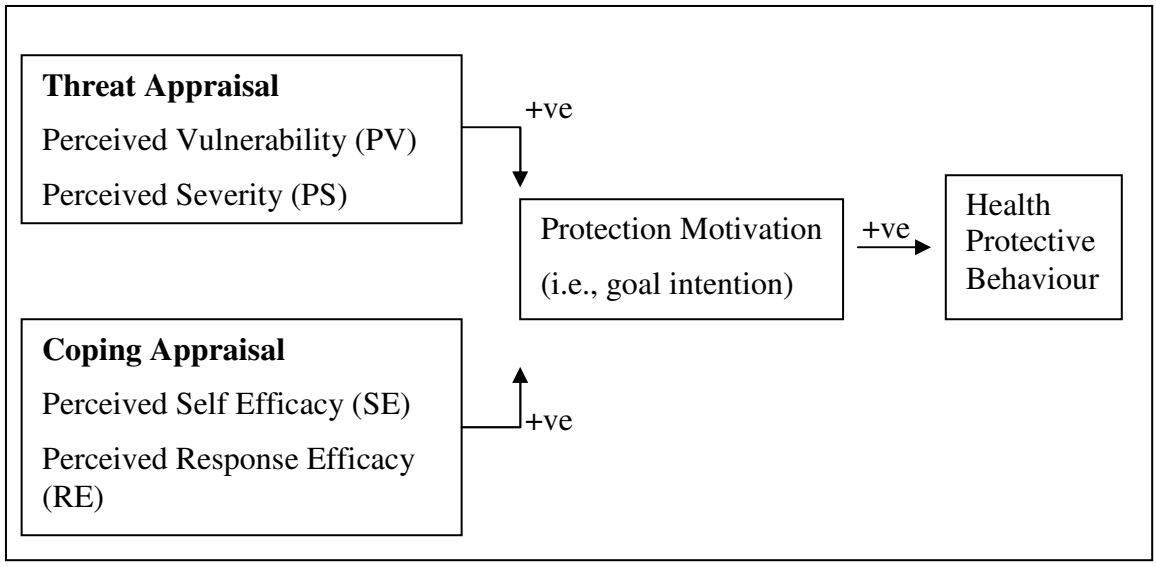
During the post-intervention focus groups, women expressed a desire for the following: more information regarding health risks following GDM; an opportunity to connect with other women who had GDM; and more practical information on physical activity and diet, particularly optimal carbohydrate type following GDM. The research conducted by Ferrera et al. (2011) adds to the body of evidence that unique resources are required for this population of women. More research is also needed to determine which behaviour change models are most effective in this population. While Ferrari and colleagues (2011) reported that the dietitians incorporated behaviour constructs from the social cognitive theory and the trans-theoretical model of behaviour change, there was no analysis or commentary published regarding the effectiveness of these theories.

2.6 Non-intervention behaviour change theory research conducted in this population

Few studies have applied behaviour change theories to predict diabetes prevention behaviours in this population. Research conducted by Swan and colleagues, however, found that 64% of women with a pGDM were in the pre-action stages of change (i.e., pre-contemplation, contemplation, and preparation) with regard to T2DM prevention behaviours (Swan, Kilmartin, & Liaw, 2007). According to the Transtheoretical Model of behaviour change, individuals in the pre-action stages of change are not ready to change, ambivalent about behaviour change, or are ready to make change within the next month but are not currently practicing risk reduction behaviours (Peipert and Ruggiero, 1998). This study, in combination with research on the unproductive health beliefs in this population (i.e., inaccurate risk perception and low self efficacy), imply that interventions designed to increase intention to engage in risk reduction behaviours by addressing these health beliefs are of value.

2.7 The Protection Motivation Theory

The Protection Motivation Theory is a beliefs based model that is designed to predict intention to engage in risk reduction behaviours, and in turn, predict the behaviours themselves. This theory was originally developed by Rogers (1975) to provide a framework for fear-based appeals; however, a modified version of this theory (Maddox and Rogers, 1983) is now being used as a general model of decision making in relation to threats, such as the threat of developing T2DM following GDM (Milne et al., 2000). According to this model, intention to engage in disease prevention behaviours depends on four main constructs (figure 1). These constructs are broken down into two main belief groupings, *threat appraisal* which includes perceived vulnerability to the threat (PV) and perceived severity of the threat (PS); and *coping appraisal* which includes the perceived effectiveness of the recommended behaviour in reducing the risk of the threat (response efficacy, RE) and the belief in one's ability to perform the recommended risk reduction behaviour (self efficacy, SE), (Maddox and Rogers, 1983). According to the theory, if all four constructs are positively influenced, protection motivation or intention to engage in the risk reduction behaviour is increased, which should positively influence behaviour.



PMT=Protection Motivation Theory, T2DM = Type 2 Diabetes. +ve = positive association.

Figure 1. A schematic representation of the Protection Motivation Theory.

A meta-analytic review of the overall utility of the PMT model in predicting health-related behaviours and eliciting health-related behaviour change suggested that the use of PMT in the design of persuasive disease prevention messaging was promising (Milne et al., 2000). While the threat appraisal beliefs (PV, PS) were less reliable than the coping appraisal beliefs (RE, SE) in predicting intention, all PMT variables demonstrated a significant positive relationship with intention, particularly self efficacy. Upon review, the associations between the threat appraisal variables and intention were small to medium (PV, r+ = .16; PS, r+ = .10); however, the associations between the coping appraisal variables and intention were considered medium (RE, r+ = .29; SE, r+ = .33). Self efficacy was also the variable that was most often significantly associated with intention across studies in this review.

In this meta-analysis, Milne et al. (2000) also reported that the associations between the PMT variables and concurrent health behaviours (i.e., PV, r+ = .13; PS, r+ =.10; RE, r+ =.17; SE, r+ = .36) generally mirrored their relative associations with intention. However, the strength of RE's relationship with concurrent behaviour was considerably weaker than its association with intention. Again, among the PMT constructs, SE most often predicted behaviours across the studies. Intention, however, proved to be the strongest (r+ = .82) and most reliable predictor of concurrent behaviours, accurately predicting concurrent health related behaviours in all studies included in the meta-analysis. Significant associations with subsequent behaviours in this meta-analysis were limited to PV (r+ = .12), SE (r+ = .22), and intention (r+ = .40). These associations were generally weaker compared to the associations observed with concurrent behaviours. Intention, again, proved to be a reliable predictor, accurately predicting subsequent behaviours in 66% of the studies.

Interventions based on PMT have been effective in motivating a variety of groups to engage in health-related behaviours (Milne et al., 2000); however, the effectiveness of PMT-grounded messaging has not yet been investigated in this population. Further, research on PMT-grounded, clinically-based health education interventions is also limited. Much of the successful PMT research conducted to-date has experimentally manipulated PMT constructs into high and low conditions using non-factual information

(Milne et al., 2000). This use of non-factual information is an obvious barrier to applying PMT research in clinical settings, which require evidence-based risk communication and recommendations.

Gaston and Prapavessis (2009) were among the first to address this gap in the research. In this study, Gaston and Prapavessis used the PMT framework to examine whether information about the role of exercise in preventing maternal-fetal disease could increase intention to exercise during pregnancy and increase self reported physical activity. The researchers found that fact-based, PMT-grounded messaging, in the form of a brochure, significantly increased, PS, RE, SE, intention, and follow-up physical activity. Upon regression analysis, Gaston and Prapavessis found that PS, RE, and SE accounted for 51% of the variance in intention, with RE and SE making unique contributions to this variance. Self efficacy also uniquely contributed to the variance in follow-up exercise behaviours. The researchers concluded that PMT-grounded information is effective in positively influencing pregnant women's health beliefs, intentions, and supporting initial behaviour changes. Building on these findings, our research will examine the effectiveness of a PMT-grounded, fact-based information session in increasing intention to engage in T2DM prevention behaviours among women with pGDM and will examine the utility of the PMT model in predicting these intentions and associated T2DM risk reduction behaviours.

Chapter 3

3. Methods

3.1 Ethics approval

Ethics approval for the involvement of human subjects was obtained through the University of Western Ontario Research Ethics Board (Appendix A). Approval was also received from the Lawson Health Research Institute to conduct research at St. Joseph's Health Care (Appendix B).

3.2 Measures

Questionnaires designed for those who chose to attend the information session (attendees) and those who chose not to attend the information session (non-attendees) were mostly identical with the exception of a few questions included in the final questionnaire. These questions were focused on obtaining attendees' overall impression of the information session, as well as obtaining information regarding barriers to attending the information session from non-attendees.

Many of the measures were adapted from previous studies conducted by other researchers or were created entirely by our research team. If a source is not mentioned, the questions were created by our research team. Please refer to Appendix D through Appendix G to view the questionnaires developed for this study.

Demographic variables

Demographic questions about participant age, education level, household income, parity, number of dependent children, and ethnicity were collected during pregnancy in questionnaire #1 (Q1).

Risk factor variables

Questions regarding risk factors were asked in Q1 and were based on T2DM risk factors identified by the Canadian Diabetes Association (2008) and a meta-analysis on risk factors for T2DM risk factors among women with pGDM. (Bellamy et al., 2009)

PMT variables

Measures of PMT variables were collected via questionnaire #3 (Q3), which was collected two to three months following the scheduled voluntary information session from both attendees and non-attendees and via questionnaire #2 (Q2), which was collected prior to the information session from only those who attended the session. Both Q2 and Q3 used identical questions to assess the four PMT constructs (i.e., PV, PS, RE, SE). Threat appraisal (i.e., PV, PS) questions were asked for T2DM. Questions about the coping appraisal constructs (i.e., RE, SE) were asked for all seven recommended behaviours (figure 2) and each of these questions were written in reference to developing T2DM. All questions were asked using a seven point ordinal scale. Three items were used for each of the constructs. These questions were adapted from Gaston and Prapavessis (2009). Examples include the following: "I think it is likely that I will develop Type 2 Diabetes" (PV)**;** "I feel that it would be very serious for me to develop Type 2 Diabetes" (PS); "I feel that the evidence linking physical exercise to Type 2 Diabetes risk reduction is very strong (RE)"; "If I wanted to, I could easily consume the types and amounts of vegetables and fruit necessary to reduce my risk of developing Type 2 Diabetes" (SE).

1. Consume a healthy breakfast everyday
2. Consume a variety of vegetables and fruit throughout the day, including dark leafy green vegetables
3. Avoid sugar sweetened beverages
4. Replace refined grains with whole grains
5. Replace trans fat and saturated fat with unsaturated fat
6. Be physically active for at least 150 minutes each week in bouts of 10 minutes or more
7. Aim for a gradual weight loss of 5-10% of pre-pregnancy body weight, if overweight prior to pregnancy

Figure 2: Recommended Type 2 Diabetes risk reduction behaviours

Intention variables

Like the PMT constructs, a seven point ordinal scale was used to measure intention. These questions were also asked for all seven of the recommended behaviours and each question was written in reference to developing T2DM. Unlike the PMT constructs, only a single question was asked about intention for each behavior, using an item adapted from Gaston and Prapavessis (2009). A sample item is "Do you plan to avoid sugar sweetened beverages to reduce your risk of Type 2 Diabetes?". Potential responses ranged from definitely not (1) to definitely (7).

Diabetes prevention behaviour variables

Physical activity was assessed using the Godin Leisure-Time Exercise Questionnaire (GLTEQ; Godin & Shepherd, 1985). This questionnaire generates a total activity score in terms of the metabolic equivalents of task (MET). Participants were asked how many times they engaged in strenuous, moderate, and mild exercise for at least 10 minutes over the past seven days. Ten minutes was chosen as the minimum exercise session length based on the Canadian Physical Activity Guidelines for Adults (Canadian Society for Exercise Physiology, 2011). All other behaviour questions were formulated in a way that would facilitate comparison to existing literature. These measures were comprised of both open ended and multiple choice questions.

3.3 Procedure

Recruitment

Potential study participants were approached by the lead investigator or research assistant while waiting for their regularly scheduled appointment at the SJHC Endocrine and Pregnancy clinic. At this time, women were asked if they would like to participate in a study examining the effectiveness of an information session designed to increase awareness about their risk of diabetes and inform them about diabetes prevention behaviours. Potential participants were provided with a letter of information if they expressed interest. Informed consent was received via a signed letter of consent, as per the UWO ethics protocol (Appendix C). Participants were recruited between September 2011 and February 2012. As an incentive, all participants were mailed a $15 Wal-Mart gift card after the researcher received their final questionnaire.

All patients at the SJHC Endocrine and Pregnancy clinic, including study participants, had an equal opportunity to attend the information session created for the study and were mailed an invitation to the session following their pregnancy. Study participants were contacted the week before the session to remind them about the session and all women had a chance to reschedule their session as needed. The information session took place on a Tuesday evening once per month.

Creation of the PMT-based information session

The information session was created and co-led by the clinic's Endocrinologist and Registered Dietitian, who is also the author of this study. The PMT constructs (PV, PS, RE, SE) were employed in the messaging of the information session. Perceived vulnerability was communicated using evidence-based estimates of risk for T2DM in post-GDM women. Perceived severity was incorporated by discussing the complications associated with T2DM. Response efficacy and self efficacy were integrated into all seven diabetes prevention recommendations. Response-efficacy was based on clinical recommendations to reduce T2DM risk. Self-efficacy was addressed by providing participants with practical strategies to implement the recommendations and by referring

them to relevant resources. The session was an hour in length and was guided by a power point presentation. Participants were encouraged to ask questions throughout the presentation and to share insights and tips for achieving the diabetes prevention behaviours.

Questionnaire administration

Originally, all participants were asked to complete Q1 at the clinic between 34 and 40 weeks gestation, complete Q2 just before the information session (4-5 months post partum), and complete Q3 at home and return in a postage paid envelop. Questionnaire #3 was mailed 2 months after the attended information session or the scheduled date of the information session (for non-attendees). However, due to poor Q2 and Q3 response rates resulting from participants arriving too late to the session to complete Q2 and frequent mailing address changes in this group, the research team chose to offer the option of completing any of the three questionnaires on-line via Survey Monkey™. This change was approved by the UWO ethics committee April 2011 and took effect early May 2011. See figure 3 for a flow diagram of the design and overall procedure.

3.5 Statistical analysis

The analysis of this study included the following procedures: paired and unpaired student t-tests (t), chi square tests (x^2), correlation analysis (r), logistic regression and multiple regression analyses. All data were analyzed using SSPS version 20.

To examine differences between attendees and non-attendees in PMT constructs and intention, independent student t-tests were employed. For each PMT construct, scores from all three questions were totaled and the mean scale score was compared across the two groups. Differences in behaviour were assessed via chi square tests, in addition to independent student t tests, when appropriate

Correlations between PMT constructs, intention, and diabetes prevention behaviours were analyzed using the Pearson's correlation or Spearman's Rank correlation tests,

followed by a regression analysis to assess the predictive utility of the PMT model for each behaviour.

Logistic regression was conducted to investigate the relationships between the PMT variables and behaviour variables that were dichotomous (e.g., whether or not participants consider the contents of the ingredient list when purchasing food.) Multiple regression analyses were conducted next to investigate the relationships between the PMT variables and behaviour variables that were not dichotomous. To reflect the PMT model, regression analyses were conducted in a hierarchical manner in which intention was entered into the first block and PMT constructs (i.e. PV, PS, RE, SE) were entered in to the second.

Correlation tests were also used to investigate hypothesized correlations between the PMT variables and other demographic and lifestyle factors. Finally, paired student t-tests were used examine differences in health beliefs and behaviour from pregnancy to post-partum between the attendees and non-attendees.

Chapter 4

4. Results

4.1 Preliminary analysis

To begin, all data were screened and outliers were eliminated using the outlier labelling rule. The analyses were conducted to test the assumptions of multiple and logistic regression and to test for multicolinearity between study variables. No variables were too highly correlated, indicating that this assumption was not violated. The Durbin-Watson test was used to check whether residuals were independent; test values revealed that this assumption was supported. Finally, residual plots were examined to check the assumption of homoscedasticity (assumption that residuals have the same variance) and normality of residuals; no violations to these assumptions were found.

Levels of internal consistency among the three questions for each of the constructs ranged from .75 to .95 (chronbach's alpha), which according to Tavakol and Dennick (2011) is acceptable. Therefore, no items were excluded from the analysis.

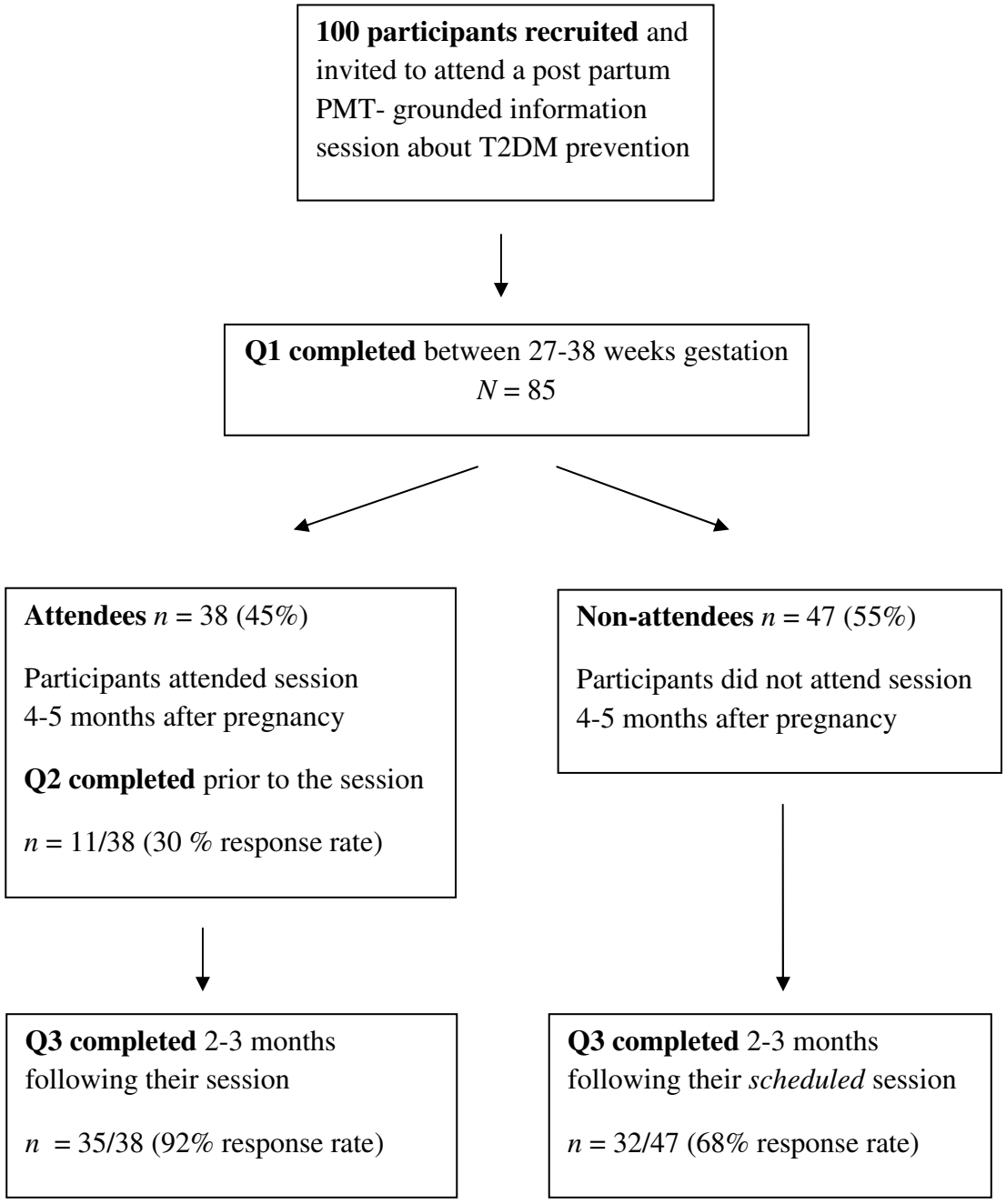


Figure 3: Flow diagram of the design and overall procedure.

One hundred women were recruited for this study. Eighty-five of these women completed Q1. Of those who completed Q1, 67 (79% response rate) women completed Q3. Thirty five of these participants attended the information session and 32 did not attend (figure 3). Only 11 of the 35 attendees (30% response rate) completed Q2, which compromised the researchers' ability to conduct the originally planned pre-post analysis. No individuals were removed from the final dataset.

Participants were women residing in London, Ontario and surrounding area. Participants ages ranged from 21 to 42 with an average age of 32.5 years (SD = 4.7). All women were pregnant at time of recruitment and were being treated for GDM at the SJHC Endocrine and Pregnancy Clinic. Most of the participants were well educated with more than 75% of the women having completed post secondary education. On average, participants were pregnant with their second child and had 1.1 (SD = 1.3) dependent children. Over 80% of those who responded reported an annual, before tax, household income of more than $45, 000, which is significantly greater than the $ 36 456 Canadian low income cut off for a household of two adults and two children (Statistics Canada 2008). Also, more than a third of these women reported a household income that exceeded $100, 000. These individuals were mostly of non-Hispanic Caucasian descent (86.6%). The average BMI of the participants was 31.2 kg/m² (SD=7.1 kg/m²), which is classified as obese (Health Canada, 2003). In fact, 83% of these women were overweight or obese prior to becoming pregnant, confirming that the majority of the participants had at least one modifiable risk factor for T2DM (i.e., elevated BMI). All relevant demographic and T2DM risk factor information are presented by group in table 1 and 2 in the results section.

An a priori sample size calculation estimated that for a between groups design with an alpha level of 0.05 and a power of .80, a sample of 26 to 64 subjects per group was required (Cohen, 1992). Therefore, the sample size for this exploratory study was anticipated to be adequate.

4.2 Group equivalency and group differences

Student t-tests and chi squared tests were used to analyze differences in demographic characteristics (table 1), as well a number and type of risk factors (table 2) between attendees and non-attendees. No significant demographic differences were observed. The majority of women in both groups were overweight or obese prior to pregnancy and all women had at least two risk factors for T2DM, in addition to their GDM diagnosis. Attendees and non-attendees had a comparable number or total risk factors and no differences in the rates of any individual risk factor, with the exception of insulin use during pregnancy. Women who attended the information session were significantly more likely to have used insulin during their pregnancy to manage their blood glucose levels. Rates of Polycystic Ovary Syndrome (PCOS) were also greater among attendees, nearly reaching significance.

Table 1: Demographic characteristics of study participants

	Attendees (*n*=35)	**Non-Attendees (*n*=32)**	**Total**	**Statistic**	***p***
Age (years): *n* Mean ± SD[1] Range (Median)	35 33.3 ± 4.3 25-42 (33)	32 31.5 ± 4.9 21-40 (32)	67 32.5 ± 4.7 21-42 (33)	t(65)=1.67	.11
Annual household income (before tax): *n* Under $45 000 $45 000 - $79 999 $80 000 - $99 999 Over $100 000 Prefer not to answer	35 14.3% 25.7% 20.0% 28.5% 11.5%	32 18.7% 15.6% 15.6% 25.0% 25.0%	67 16.4% 20.9% 17.9% 26.9% 17.9%	$x^2(3,N=55)=.91$	.82
Completed education: *n* Secondary School or less College University (Undergraduate) University (Graduate)	34 25.4% 32.4% 23.5% 18.7%	31 22.6% 38.7% 22.6% 16.1%	65 24.6% 35.4% 23.1% 16.9%	$x^2(3,N=65)=.31$	.96
Parity: *n* Mean ± SD Range (Median)	34 2.24 ±1.16 1-5 (2)	31 2.23 ± 1.41 1-6 (2)	65 2.23±1.27 1-6 (2)	t(63)= .03	.98
Number of dependent children: *n* Mean ± SD Range (Median)	30 1.20±1.52 0-7 (1)	24 1.13±0.85 0-3 (1)	54 1.16±1.26 0-7 (1)	t(52)=.21	.83

SD=Standard Deviation

Table 2: Number and type of T2DM risk factors among study participants

	Attendees ***(n=35)***	**Non-Attendees** ***(n=32)***	**Total**	**Statistic**	***p***
Modifiable risk factors					
Pre-pregnancy BMI (kg/m^2): Mean ±SD Range (Median)	 30.42± 5.06 20.1-40.9 (30.3)	 32.00± 8.90 17.28-53.88 (32.2)	 31.17±7.15 17.28-53.88 (31.2)	$t(65)= -.90$	.37
Pre-pregnancy overweight (>24.9 kg/m^2)	22.9%	21.9%	22.4%	$x^2(1,N=67)=.01$	.92
Pre-pregnancy obesity (>29.9 kg/m^2)	57.1%	59.4%	58.2%	$x^2(1,N=67)=.03$	.85
Non-modifiable risk factors					
Previous GDM	22.9%	28.2%	25.4%	$x^2(1,N=67)=.24$	.62
Previous delivery of a macrosomic infant (>4 kg)	14.3%	19.4%	16.6%	$x^2(1,N=66)=.34$	.58
PCOS diagnosis	14.3%	0.0%	7.5%	$x^2(1,N=67)=4.94$	.054
Family history T2DM	50.0%	31.3%	40.9%	$x^2(1,N=66)=2.40$	.12
Aboriginal, Hispanic, South Asian, African descent	8.6%	19.4%	13.4%	$x^2(1,N=66)=1.62$	.29[4]
GDM diagnosis < 24 weeks gestation	20.6%	9.8%	15.4%	$x^2(1,N=65)=1.48$	.31
Insulin use during pregnancy	60.0%	25.0%	43.3%	$x^2(1,N=67)=8.34$	**<.01**
Elevated cholesterol	2.9%	6.3%	4.5%	$x^2(1,N=67)=.45$	.60
High blood pressure	8.6%	0.0%	4.5%	$x^2(1,N=67)=2.87$	.24
Number of risk factors[2]: Mean ± SD Range (Median)	 4.88 ± 1.45 2-9(5)	 4.22± 1.36 2-7(4)	 4.57 ± 1.44 2-9 (4)	t(65)= 1.93	. 06

[1]Fisher's exact test statistic,[2] Number of risk factors for T2DM in addition to current GDM diagnosis (there were no self reported cases of acanthosis nigricans or age > 40 years old). BMI = body mass index, m = meters, kg = kilograms, PCOS = Polycystic Ovary Syndrome, SD=standard deviation.

To test whether there were differences in the PMT variables, intentions, and diabetes prevention behaviours between those who attended the information session and those who did not, independent student t-tests were conducted two to three months after the participants' information session was scheduled. The results of these tests revealed that there were no differences between the groups for threat appraisal constructs (PV,PS) for T2DM (table 3) or intention to engage in any of the diabetes prevention behaviours (table 4). A general trend of stronger intentions among attendees for the diet-related prevention behaviours was noted; however, the differences between the groups did not reach a level of significance.

Table 3: Threat appraisal variables among attendees and non-attendees

Variables	Attendees (*n*=35)	Non-Attendees (*n*=32)	Statistic	*p*
Type 2 Diabetes				
Perceived Vulnerability Mean ± SD Range (Median)	 5.04±1.47 1-7 (5)	 4.63±1.22 1-7 (5)	 *t*(65)=1.21	 .23
Perceived Severity Mean ± SD Range (Median)	 5.62±1.36 1-7 (6)	 5.29±1.31 1-7 (6)	 *t*(65)=1.00	 .32

SD=standard deviation

Table 4: Intentions to engage in the recommended diabetes prevention behaviours among attendees and non-attendees

Variables	Attendees *(n=35)*	Non-Attendees *(n=32)*	Statistic	*p*
Regular healthy breakfast consumption				
Mean ± SD Range (Median)	5.91±1.24 2-7 (6)	5.53±1.41 1-7 (6)	t(64)= 1.16[2]	.25
Vegetable and fruit consumption				
Mean ± SD Range (Median)	5.97±1.00 4-7 (6)	5.84±1.16 4-7 (6)	t(64)= .47	.64
Avoidance of sugar sweetened beverages				
Mean ± SD Range (Median)	5.97±1.38 2-7 (7)	5.41±1.34 1-7 (6)	t(63)= 1.67	.10
Replacement of refined grains with whole grains				
Mean ± SD Range (Median)	5.71±1.06 3-7 (6)	5.34±1.15 4-7 (5)	t(64)= 1.33	.19
Replacement of trans and saturated fats with unsaturated fats				
Mean ± SD Range (Median)	5.75±1.02 4-7 (6)	5.26±1.34 1-7 (5)	t(61)= 1.65	.10
Regular engagement in physical activity				
Mean ± SD Range (Median)	5.53±1.42 3-7 (6)	5.63±1.48 2-7 (6)	t(64)= - .27	.79
Body weight management				
Mean ± SD Range (Median)	5.71.±1.29 3-7 (6)	5.72±1.94 1-7 (7)	t(64)= - .03	.97

SD=standard deviation

These groups did, however, differ on several coping appraisal constructs (RE, SE) across the diabetes prevention behaviours (table 5). Attendees scored higher on RE for regular healthy breakfast consumption, vegetable and fruit consumption, and consumption of whole grains in place of refined grains. Response efficacy had a small to medium effect size for all three of these behaviours, according to Cohen's (1992) effect size index for comparing independent means. Self efficacy for avoiding SSB was also greater among those who attended the information session compared to those who did not attend. Self efficacy for avoiding SSB appears to also have had a small to medium effect on reduced consumption as well. In addition, there was a trend for higher RE scores among attendees for both weight management (p =.08) and consumption of unsaturated fats in place of saturated and trans fats (p =. 07).

Table 5: Coping appraisal variables between attendees and non-attendees

Variables	Attendees *(n=35)*	Non-Attendees *(n=32)*	Statistic	*p*	Cohen's D	Effect Size
Healthy breakfast consumption						
RE: Mean ± SD[1] Range (Median)	6.08±0.95 4-7 (6)	5.59±1.10 2-7 (6)	t(64)= 1.96	**<.05**	.48	.23
SE: Mean ± SD Range (Median)	5.63±1.36 1-7 (6)	5.31±1.45 1-7 (6)	t(64)= .91	.37		
Vegetable and fruit consumption						
RE: Mean ± SD [1] Range (Median)	6.00±1.0 1-7 (6)	5.11±.92 1-7 (5)	t(64)= 3.02	**<.01**	.78	.36
SE: Mean ± SD Range (Median)	5.12±1.4 1-7 (5)	5.29±1.31 2-7 (6)	t(64)= - 0.53	.60		
Avoidance of sugar sweetened beverages						
RE: Mean ± SD Range (Median)	6.15±0.97 4-7 (7)	5.84±1.09 4-7 (6)	t(63)= 1.21	.23		
SE: Mean ± SD Range (Median)	6.07±1.05 3-7 (6)	5.42±1.43 1-7 (6)	t(63)= 2.10	**<.05**	.52	.25
Replacement of refined grains with whole grains						
RE: Mean ± SD Range (Median)	6.02±0.81 4-7 (6)	5.30±0.95 3-7 (5)	t(64)= 3.30	**<.01**	.81	.38
SE: Mean ± SD Range (Median)	5.39±1.09 3-7 (6)	5.34±1.09 3-7 (5)	t(64)= 0.18	.86		
Replacement of trans and saturated fats with unsaturated fats						
RE: Mean ± SD[1] Range (Median)	5.87±0.96 1-7 (6)	5.40±1.06 2-7 (5)	t(63)= 1.88	.07		
SE: Mean ± SD Range (Median)	5.38±1.19 2-7 (6)	5.26±1.09 2-7 (5)	t(63)= .44	.66		
Physical activity						
RE: Mean ± SD[1] Range (Median)	6.63±0.67 5-7 (7)	6.42±0.78 3-7 (7)	t(64)= 1.13	.26		
SE: Mean ± SD Range (Median)	4.73±1.42 1-7 (5)	5.62±1.42 1-7 (6)	t(64)= -1.72	.09		
Weight Management						
RE: Mean ± SD[1] Range (Median)	6.73±0.62 4-7 (7)	6.29±1.31 1-7 (7)	t(64)= 1.77	.08		
SE: Mean ± SD Range (Median)	4.23±1.41 1-7 (4)	4.45±1.32 1-7 (4)	t(64)= -.63	.53		

SD=standard deviation, RE= response efficacy, SE = self efficacy

There were no significant differences in post GDM diabetes prevention behaviours between the groups, with the exception of intake of dark green leafy vegetables. Attendees were significantly more likely to consume at least one serving of dark leafy green vegetables during the day prior to the survey than non-attendees (47% vs. 19% of study participants; table 6). This difference, however, was not meaningful since attendees post partum green leafy vegetable intake was not significantly different from their pregnancy intake ($t(28)= .71$, $p = .48$). Women who attended the information session were more likely to be screened for T2DM compared to those who did not attend (77% vs. 14%). Nearly a quarter of the attendees who were screened, had A1c values that met the American Diabetes Association's diagnostic criteria for "high risk" for developing T2DM (American Diabetes Association, 2010).

To determine whether there were group differences in diet-related behaviours from pregnancy to post partum, paired student t tests were conducted. The results of these tests revealed that most of the dietary behaviours remained the same from pregnancy to post-partum in both groups; however, volume of SSB intake significantly increased and frequency of breakfast consumption significantly decreased among both attendees and non-attendees during the post natal period. Among attendees, there was a significant decrease in weekly breakfast consumption frequency from pregnancy ($M=6.87$, $SD=.51$) to post partum ($M=5.03$, $SD=2.28$); $t(29)= -.94$, $p < .01$. Non attendees experienced a similar decrease in breakfast consumption from pregnancy ($M=6.52$, $SD=1.31$) to post partum ($M=4.25$, $SD=2.29$); $t(30)= -3.12$, $p < .001$. While consumption of breakfast decreased, intake of SSB increased. Among attendees, the approximate of daily SSB intake increased from pregnancy ($M=.25$, $SD=.51$) to post partum ($M=.88$, $SD=1.18$); $t(31)= 1.05$, $p < .05$. Again, non attendees experienced a similar increase in daily volume of SSB intake from pregnancy ($M=.33$, $SD=.61$) to post partum ($M=1.47$, $SD=1.61$); $t(29)= .58$, $p < .001$. The values for SSB consumption volume can be approximately equated to metric cups.

Table 6: Diabetes prevention behaviours among attendees and non-attendees

Variables	Attendees (*n*=35)	Non-Attendees (*n*=32)	Statistic	*p*
Healthy breakfast consumption				
Breakfast consumed during previous 7 days (days) Mean ± SD Range (Median)	 5.03±2.28 0-7 (6)	 4.25±2.29 0-7 (5)	 t(63)=1.38	 .17
Consumed breakfast all 7 days	45.4%	25.0%	x^2(1,N=65)=2.20	.14
Vegetable and fruit consumption (24 hour dietary recall)				
Vegetables (servings) Mean ± SD Range (Median)	 2.28±1.57 0-5 (1)	 1.64±1.73 0-6.5 (1)	 t(49)= 1.37	 .18
Green Leafy Vegetables (1 or more servings)	46.6%	19.2%	x^2(2,N=56)=4.67	**<.05**
Total Vegetable and Fruit Consumption (servings) Mean ± SD Range (Median)	 3.45±2.66 0-10 (3)	 2.96±2.91 0-10 (2.5)	 t(62)= .70	 .49
Total Vegetable and Fruit Variety (nb of different types) Mean ± SD Range (Median)	 3.48±2.05 0-7 (4)	 3.29±2.36 0-8 (4)	 t(62)= .35	 .72
Typical daily consumption of sugar sweetened beverages				
Volume of SSB consumption during a typical day (metric cups, 250 mL)	<½ 47.1% ½ - 2 41.2% > 2 11.8%	<½ 43.7% ½ - 2 25.0% > 2 31.3%	x^2(3,N=66)=4.2	.12
< ½ cup SSB/day	47.1%	43.7%	x^2(2,N=66)=.24	.62
Nutrition label reading behaviours related to selection of grain and fat containing foods				
Reading labels	Always 20.6% Most times 55.9% Half the time 14.7% Sometimes 8.8% Never 0.0%	Always 12.9% Most times 54.8% Half the time 29.0% Sometimes 3.2% Never 0.0%	x^2(8,N=65)=1.27[3]	.77
Choosing the healthier option based on nutrition label	Always 14.7% Most time 70.5% Half the time 8.8% Sometimes 5.8% Never 0.0%	Always 21.9% Most times 65.6% Half the time 12.5% Sometimes 0.0% Never 0.0%	x^2(8,N=66)=.78	.85

Table 6: Diabetes prevention behaviours among attendees and non-attendees (continued)

Variables	Attendees *(n=35)*	Non-Attendees *(n=32)*	Statistic	*p*
Nutrition label reading behaviours related to selection of grain and fat containing foods				
Considering fibre	82.4%	69.7%	x^2(2,N=66)=1.66	.20
Considering trans fat	58.8%	40.6%	x^2(2,N=66)=2.18	.14
Considering saturated fat	52.9%	34.4%	x^2(2,N=66)=2.31	.13
Ingredients list	64.7%	53.1%	x^2(2,N=66)=.91	.34
Physical activity				
Modified Godin Leisure Time Activity Score Mean ± SD Range (Median)	37.62 ± 22.49 5-92 (36)	44.61 ± 28.17 0-110 (41)	t(62)= -1.11	.27
Frequency of Physical Activity (bouts of 10 or more minutes) Mean± SD Range (Median)	8.41 ± 4.61 1-19 (7)	10.34 ± 6.37 0-30 (11)	t(62)= -1.39	.17
Moderate physical activity 5 or more times per week	33.3%	38.7%	x^2(2,N=61)=.19	.66
Body weight management				
Achieved pre-pregnancy weight or further weight loss below pre-pregnancy weight	59.3%	55.5%	x^2(2,N=54)=.08	.78
T2DM screening				
Completed A1c test	77.1%	13.6%	x^2(1,N=67)=25.81	**<.01**
Meeting ADA prediabetes diagnostic criteria A1c (5.7-6.4 mmol/mol)	22.9%	0%		
Meeting ADA diabetes diagnostic criteria A1c (≥6.5 mmol/mol)	0%	0%		

c = metric cups (250 mL), ADA= American Diabetes Association, SSB = Sugar Sweetened Beverages, SD=standard deviation,

4.3 Correlations between PMT variables, intention, and behaviour

Analysis of correlations was conducted for PMT variables, intentions, and diabetes prevention behaviours. The results from the correlation analysis are presented in the tables following each behaviour subheading. Predictor variables were entered into a multiple regression analysis if they were significantly correlated with the criterion variables of interest to determine their uncorrelated contribution.

4.3.1 Recommended Behaviour #1: Consume a healthy breakfast everyday

Table 7: Bivariate correlations between PMT variables, intention, and healthy breakfast consumption

	1	2	3	4	5	6	7
1. PV	__	.30*	.00	- .12	- .01	- .06	-.17
2. PS		__	.10	.04	.05	- .10	- .15
3. RE			__	.63**	.54**	.45**	.36**
4. SE				__	.86**	.80**	.72**
5. Intention					__	.76**	.61**
6. Behaviour[1]						__	__
7. Behaviour[2]							__

[1]Behaviour= Number of days a healthy breakfast was consumed during the previous 7 days
[2]Behaviour= Consuming a healthy breakfast all 7 days
*Correlation is significant at the .05 level
**Correlation is significant at the .01 level

Predicting intention

Intention to consume a healthy breakfast everyday was positively related to RE and SE. The predictive ability of both of these coping appraisal variables were tested in one regression. These variables accounted for 77% of the variance in intention, $F(2,63) = 105.00$, $p < .001$. However, only SE made a significant unique contribution (β=.87, $p < .001$). Meaning that as beliefs in one's confidence in their ability to consume a healthy breakfast every day increased, intention to perform this diabetes prevention behaviour also increased.

Predicting behaviour

Frequency of healthy breakfast consumption was positively associated with RE, SE, and intention. A hierarchal regression was conducted to reflect the PMT model, in which intention was entered into the first block and RE and SE into the second. In this model, intention to engage in this risk reduction behaviour accounted for 53% of the variance in frequency of healthy breakfast consumption, F (1,63) = 72.19, $p < .001$. The addition of SE explained an extra 6% of the variance, R^2 change = .06, $p = .01$ and was the only variable to make a unique contribution to the frequency of healthy breakfast consumption, $\beta = .53$, $p = .03$. Therefore, SE increases intention to consume a healthy breakfast everyday and has an independent effect on the behaviour itself.

4.3.2 Recommended behaviour #2: Consume a variety of vegetables and fruits throughout the day, including dark green leafy vegetables

Table 8: Bivariate correlations between PMT variables, intention, and vegetable and fruit consumption

	1	2	3	4	5	6	7	8	9
1. PV	__	.30*	.13	- .38**	- .09	.02	- .07	- .19	- .08
2. PS		__	.15	- .18	- .02	.08	.20	.01	-.14
3. RE			__	.27*	.28*	.29*	.08	.11	.23
4. SE				__	.44**	.27	.00	.28*	.39**
5. Intention					__	.21	.14	.16	.28*
6. Behaviour[1]						__	__	__	__
7. Behaviour[2]							__	__	__
8. Behaviour[3]								__	__
9. Behaviour[4]									__

[1] Behaviour = Number of vegetable servings consumed during the previous day
[2] Behaviour = Consuming one or more servings of leafy green vegetables during the previous day
[3] Behaviour = Number of vegetable and fruit servings consumed during the previous day
[4] Behaviour = Number of different types of vegetables and fruit consumed during previous day
*Correlation is significant at the .05 level
**Correlation is significant at the .01 level

Predicting intention

Intention to consume the recommended types and amounts of vegetables and fruit, including dark leafy greens, was again positively related to the coping beliefs, RE and SE, but not to the threat beliefs of the PMT model. The predictive ability of RE and SE

were tested in one regression. Both variables were found to be predictive, accounting for 25% of the variance in intention, F (1, 64) = 15.18, $p < .001$. As beliefs about one's ability to consume the recommended types and amounts of vegetables and fruits ($\beta = 0.38$, $p = .001$) increased and beliefs about the effectiveness of this behaviour in preventing diabetes ($\beta = 0.24$, $p = .035$) increased, intention to perform this behaviour also increased.

Predicting behaviour

Total number of vegetable servings consumed. The number of vegetable servings, based on Canada's Food Guide (CFG; Health Canada, 2007), consumed during the previous day was only related to RE for consuming the recommended types and amount of vegetables and fruit. This belief predicted 6% of the variance in vegetable consumption, F(1, 49) = 4.44, $p = .04$.

Total number of vegetables and fruit consumed. In contrast, the total number of CFG servings of both vegetables and fruit consumed during the previous day was only related to SE, which also accounted for 6% of the vegetables and fruit serving variability, F (1,62) = 5.21, $p = .026$.

Variety of vegetable and fruit intake. Variety of vegetable and fruit intake during the previous day was associated with both SE and intention. Consistent with PMT theory, a hierarchal regression was conducted in which intention was entered into the first block and SE into the second. In this model, intention to consume the recommended types and amounts of vegetables and fruit to prevent diabetes accounted for 6% of the variance in variety of vegetables and fruit intake, F (1, 62) = 5.1, $p = .027$. The addition of SE increased the predictive utility of the model by explaining an additional 7% of the variance, R^2 change = .07, $p = .01$. Upon examination of the beta coefficients, neither SE nor intention made a unique contribution to the variance in the variety of vegetable and fruit intake among participants

4.3.3 Recommended Behaviour #3: Avoid Sugar Sweetened Beverages

Table 9: Bivariate correlations between PMT variables, intention, and SSB consumption

	1	2	3	4	5	6	7
1. PV	__	.30*	-.12	.07	.15	- .04	.04
2. PS		__	.07	.07	.27*	-.02	.01
3. RE			__	.51**	.53**	- .27*	.36**
4. SE				__	.82**	-.77**	.86**
5. Intention					__	- .59**	.71**
6. Behaviour[1]						__	__
7. Behaviour[2]							__

[1]Behaviour = Volume of SSB consumed during a typical day
[2]Behaviour = Limiting consumption of SSB to <1/2 cup during a typical day
*Correlation is significant at the .05 level
**Correlation is significant at the .01 level

Predicting intention

Intention to avoid SSB was significantly related to PS, RE, and SE, but not to PV. When all three variables were entered into a multiple regression analysis, they accounted for 66% of the variance in intention, $F(3, 61) = 42.5$, $p < .001$. Self efficacy accounted for the majority of the variance (61%), while PS explained an additional 4% of the variance. Examination of the beta coefficients showed that both PS and SE made unique contributions, PS ($\beta = .22$, $p = .003$), SE ($\beta = .70$, $p < .001$)

Predicting behaviour

Volume of typical daily SSB intake was negatively associated with RE, SE, and intention. A hierarchal regression was conducted to reflect the PMT model, in which intention was entered into the first block and RE and SE into the second. In this model, intention to avoid SSB accounted for 34% of the variance in volume of typical daily SSB consumption, $F(1,63) = 33.79$, $p < .001$. The addition of SE explained an additional 24% of the variance, R^2 change = 0.24, $p < .001$. Response efficacy did not add any additional predictive value. An examination of beta coefficients revealed that only SE made a unique contribution to volume of daily SSB consumption, $\beta = - .79$, $p < .001$). Meaning

that as beliefs about one's ability to avoid SSB increased, intake of volume of SSB decreased.

4.3.4 Recommended behaviour #4: Replace refined grains with whole grains

Table 10: Bivariate correlations between PMT variables, intention, and actions that facilitate replacing refined grains with whole grains

	1	2	3	4	5	6	7	8
1. PV	__	.30*	- .00	- .28*	- .01	.11	- .10	- .35**
2. PS		__	- .03	- .00	- .01	- .09	.07	- .24
3. RE			__	.57**	.66**	.21	.26*	.13
4. SE				__	.72**	-.09	.17	.32**
5. Intention					__	.12	.31*	.27*
6. Behaviour[1]						__	__	__
7. Behaviour[2]							__	__
8. Behaviour[3]								__

[1] Behaviour = Considering the fibre content when selecting products
[2] Behaviour = Considering the contents of ingredient list when selecting products
[3] Behaviour = Choosing the healthier product based on nutrition label information
*Correlation is significant at the .05 level
**Correlation is significant at the .01 level

Predicting intention

Intention to replace refined grains with whole grains was positively related to RE and SE. Both variables were found to be predictive, $F(2,63) = 23.99$, $p < .001$, adjusted $R^2 = .58$. Self efficacy predicted 51% of the variance and RE accounted for an additional 7%. As beliefs about one's ability to replace refined grains with whole grains ($\beta = 0.52$, $p < .001$) and beliefs that this behaviour will prevent diabetes ($\beta = 0.34$, $p < .001$) increased, so did intention to engage in this behaviour.

Predicting behaviour

Considering the ingredients list when selecting food products. A hierarchical logistic regression was run to investigate the impact of RE and intention on this behaviour. In the first step, intention was the predictor variable. In the second step, RE was added. The results of step one indicate that intention to replace refined grains with whole grains significantly predicted the likelihood of considering the contents of the ingredient list when selecting food products, Model x^2 (2, N=66) = 5.59 p = .02, odds ratio = 1.74 (95%

CI = 1.08-2.82). In step two, RE was entered and did not significantly improve the model, indicating that RE does not contribute to the explanation of this behaviour. In addition, adding RE into step 2 resulted in both variables having insignificant odds ratios. The predictive success of the model only containing intention was 61%.

Choosing the healthier product based on information provided on the nutrition label. This behaviour was positively correlated with SE and intention. A hierarchal regression was conducted to reflect the PMT model, in which intention was entered into the first block and SE into the second. This model predicted only 8% of the variance in this behaviour, F (2,63), $p = .03$. Intention to engage in this risk reduction behaviour accounted for 6% of the variance and SE explained an extra 2% of the variance. An examination of beta coefficients revealed that neither made a significant unique contribution to this risk reduction behaviour. Choosing the healthier product based on the information provided on the nutrition label was also negatively related to PV; however, PV was not included in the analysis because this relationship is inconsistent with the PMT theory.

4.3.5 Recommended behaviour #5: Replace trans fat and saturated fat with unsaturated fat

Table 11: Bivariate correlations between PMT variables, intention, and actions that facilitate replacing trans fat and saturated fat with unsaturated fat

	1	2	3	4	5	6	7	8	9	10
1. PV	__	.30*	.01	- .24*	-.07	.03	.23	- .01	- .10	- .35**
2. PS		__	- .11	-.14	- .05	.19	.28*	.15	.07	- .23
3. RE			__	.44**	.66**	.02	.07	- .08	.31*	-.01
4. SE				__	.68**	.26*	.32*	.08	.37**	.32**
5. Intention					__	.31*	.28*	.10	.47**	-.17
6. Behaviour[1]						__	__	__	__	__
7. Behaviour[2]							__	__	__	__
8. Behaviour[3]								__	__	__
9. Behaviour[4]									__	__
10. Behaviour[5]										__

[1] Behaviour = Considering the trans fat content when selecting products
[2] Behaviour = Considering the saturated fat content when selecting products
[3] Behaviour = Considering total fat content list when selecting products
[4] Behaviour = Considering the contents of the ingredient list when selecting products
[5] Behaviour = Choosing the healthier product based on nutrition label information
*Correlation is significant at the .05 level **Correlation is significant at the .01 level

Predicting intention

Intention to replace trans and saturated fats with unsaturated fats was positively related to RE and SE. When these coping beliefs were entered into a regression, they accounted for 66% of the variance in intention, $F(2, 60) = 60.41$, $p < .001$. Response Efficacy accounted for 49% of the variance in intention and SE accounted for the remaining 17%. Examination of the beta coefficients showed that both RE and SE made significant, unique contributions: RE (β=0.53, $p < .001$); SE (β=0.45, $p < .001$).

Predicting behaviour

Considering the trans fat content of food. A hierarchical logistic regression was run to investigate the impact of SE and intention on this behaviour. In the first step, intention was the predictor variable. In the second step, SE was added. The results of step one indicate that intention to replace saturated and trans fat with unsaturated fat significantly predicted the likelihood of considering the trans fat content of food, Model x^2 (2, N=66) = 6.57 $p = .01$, odds ratio = 1.81 (95% CI = 1.11-2.97). In step 2, SE was entered and did not significantly improve the model, indicating that SE did not contribute to the explanation of this behaviour. In addition, adding SE into step two resulted in both variables having insignificant odds ratios. The predictive success of the model only containing intention was 64%.

Considering the saturated fat content of food. A hierarchical logistic regression was run to investigate the impact of PS, SE, and intention on this behaviour. In the first step, intention was the predictor variable. In the second step, PS and SE were added. The results of step one indicate that intention to replace saturated and trans fat with unsaturated fat significantly predicted the likelihood of considering the saturated fat content of food, Model x^2 (2, N=66) = 5.04 $p = .04$, odds ratio = 1.68, 95% CI = 1.03-2.72). The addition of PS and SE into the second step significantly improved the model, Model x^2 (2, N=66) = 12.78 $p = .005$. Only the odds ratio for PS was significant in the full, two step model (odds ratio = 1.93, 95% CI = .73-2.65). The predictive success of this model was 62%.

Considering the ingredients list when purchasing food products. A hierarchical logistic regression was run to investigate the impact of RE, SE, and intention on this behaviour. In the first step, intention was the predictor variable. In the second step, RE and SE were added. The results of step one indicate that intention to replace saturated and trans fat with unsaturated fat significantly predicted the likelihood of considering the contents of the ingredient list when selecting food products, Model x^2 (2, N=66) = 15.23 $p < .001$, odds ratio = 2.72 (95% CI = 1.52 - 4.90). In step two, RE and SE were entered and did not significantly improve the model, indicating that these variables did not contribute to the explanation of this behaviour. The predictive success of the model only containing intention was 75%.

Choosing the healthier product based on information provided on the nutrition label. This behaviour was only positively correlated with SE. This single variable model predicted 10% of the variance in this behaviour, F (1,61), $p = .006$, adjusted $R^2 = .10$. Choosing the healthier product based on information provided on the nutrition label was also negatively related to PV; however, PV was not included in the analysis because this relationship is inconsistent with the PMT theory.

4.3.6 Recommended Behaviour # 6: Engage in moderate physical activity, for at least 150 minutes per week

Table 12: Bivariate correlations between PMT variables, intention, and physical activity

	1	2	3	4	5	6	7	8
1. PV	__	.30*	.12	- .29*	- .12	-.18	-.11	- .23
2. PS		__	.31*	-.05	.12	- .08	- .07	- .18
3. RE			__	.25*	.43**	- .11	- .14	- .03
4. SE				__	.65**	.28*	.22	.25*
5. Intention					__	.07	.07	.09
6. Behaviour[1]						__	__	__
7. Behaviour[2]							__	__
8. Behaviour[3]								__

[1]Behaviour= Modified Godin Leisure Time Physical Activity Score
[2]Behaviour= Frequency of Leisure Time Physical Activity
[3]Behaviour= Moderate physical activity five or more times per week
*Correlation is significant at the .05 level
**Correlation is significant at the .01 level

Predicting Intention

Intention to engage in the recommended amount and type of physical activity was positively related to RE and SE. The predictive ability of both coping appraisal variables were tested in one regression. Scores on the RE and the SE scales were entered as predictors of intention to engage in the recommended types and amount of physical activity. Both variables were found to be predictive $F(2, 63) = 35.21$, $p < .001$, adjusted R square = .51. Self efficacy accounted for 41% of the variance and the addition of RE explained the remaining 10% of the variance in intention. As beliefs about one's ability to perform the behaviour increased ($\beta = 0.60$, $p < .001$) and beliefs about the effectiveness of the behavior in preventing diabetes increased ($\beta = 0.32$, $p = .001$), intention to perform the behaviour also increased.

Predicting behaviour

Only SE was significantly correlated with the modified Godin Leisure Time Physical Activity Score. Self efficacy predicted 8% of the variance in this score, $F(1, 60) = 5.27$, $p = .02$. No PMT constructs were correlated to frequency of leisure time physical activity. Engaging in moderate physical activity five or more times per week was also significantly predicted by SE, Model χ^2 $(2, N = 61) = 4.58$, $p = .03$, odds ratio = 1.50, CI = 1.71-2.21. The predictive success of this model was 10%.

4.3.7 Recommended behaviour: Aim for a gradual weight loss of 5-10% of pre-pregnancy body weight, if overweight prior to pregnancy

Table 13: Bivariate Correlations between PMT variables, intentions, and weight management

	1	2	3	4	5	6
1. PV	__	.30*	.09	- .33**	- .08	- .15
2. PS		__	.35**	- .05	- .01	- .11
3. RE			__	.21	.44**	- .06
4. SE				__	.30*	.18
5. Intention					__	.15
6. Behaviour[1]						__

[1]Behaviour= Achieving pre-pregnancy weight or further weight loss

*Correlation is significant at the .05 level **Correlation is significant at the .01 level

Predicting intention

While intention was correlated to both RE and SE, only RE was found to be predictive $F(1,64) = 29.51$, $p < .001$, adjusted $R^2 = .35$. As RE increased, intention to maintain or achieve a healthy body weight also increased ($\beta = .60$, $p < .001$).

Predicting behaviour

Achieving pre-pregnancy body weight or a lower body weight, if overweight, was not associated with any of the PMT constructs or intention.

4.3 Demographic, health, and pregnancy factors associated with the PMT variables, intention, and behaviour

Perceived Vulnerability.

This PMT construct was positively related to total number of T2DM risk factors ($r(65) = .28$, $p < .05$), family history of diabetes ($r(64) = .31$, $p < .05$), and to insulin use during pregnancy ($r(65) = .33$, $p < .01$). None of the other proven risk factors for T2DM in this population were significantly related to the women's perception of their individual risk for developing T2DM.

Risk perception for T2DM also did not change significantly from pregnancy to six to eight months post-partum, $t(61) = 1.18$, $p = .24$. When asked to rate their risk for developing T2DM on a scale from 0 to 100% during pregnancy, participants rated their risk as 48% (*SD* = 25%), on average. When asked the same question following pregnancy participants rated their risk as 51% (SD = 20%), on average

Perceived Severity

This PMT construct was not significantly correlated with any of the suspected demographic, health, or pregnancy variables, including level of education, family history of T2DM, or insulin use during pregnancy.

Response Efficacy

Response efficacy for each of the behaviours was independent of level of education and was not related to women's perceptions of the helpfulness of similar diet and physical activity recommendations during pregnancy. Insulin use during pregnancy was also unrelated to RE postpartum.

Self Efficacy

Self efficacy, the coping appraisal construct that seemed to be least affected by the intervention, was also unrelated to all of the suspected variables (i.e., education level,

household income, ability to perform related behaviours during pregnancy, number of dependent children). Insulin use during pregnancy was also unrelated to postpartum SE. Interestingly, household income was, however, inversely related to perceived ability to follow GDM management recommendations during pregnancy.

Intention

Household income, level of education, number of dependent children, number of risk factors, insulin use during pregnancy, and risk perception were unrelated to intention to engage in any of the diabetes prevention behaviours.

Behaviour

Like in intention, household income, level of education, number of dependent children, number of risk factors, insulin use during pregnancy, and risk perception were unrelated to any of the diabetes prevention behaviours themselves. However, participation in a structured physical activity program (e.g., mom and baby yoga, stroller boot camp, sports teams) was positively associated with amount of physical activity, as assessed by the Godin Leisure time physical activity score ($r(63) = .25$, $p < .05$). Participation in a structured physical activity program was also positively related to SE in engaging in 150 minutes of moderate physical activity per week ($r(63) = .51$, $p < .01$) and intention to engage in this behaviour ($r(63) = .37$, $p < .01$).

4.4 Potential barriers to participating in the information session

As observed in table 1 and table 2, there were no significant differences between attendee's and non-attendee's socioeconomic status or risk perception. Therefore, these factors were unlikely major barriers in attending the information session. Upon qualitative analysis of the open-ended question, *Why did you choose not to attend the information session?,* the most common responses among non-attendees were related to transportation issues (e.g., lack of a ride or too far to drive) or being short on time, primarily due to the demands of parenthood.

Chapter 5

5. Discussion

Results of this study suggest that a one hour, PMT-grounded information session is likely inadequate to elicit meaningful changes in T2DM prevention behaviours or intentions to engage in these behaviours among women with a recent history of GDM. Our findings also highlight potential shortcomings of the PMT model in predicting intentions and behaviours in the unique group of women.

Evaluation of the PMT-grounded information session

While poor pre-intervention questionnaire response rates limited the researchers' ability to draw conclusions about the efficacy of the information session, comparisons between attendees and non-attendees provided some valuable information. Firstly, women who attended the information session had similar demographic characteristics, implying that this type of intervention appealed to a variety of women in our target population. Similar demographic characteristics also supported comparing women who did and did not attend the information session to examine correlations between session attendance and T2DM prevention behaviours and their respective PMT precursors (i.e., PV, PS, RE, SE, and intention).

Generally, women who attended the information session reported higher levels of RE for each of the recommended diabetes prevention behaviours, reaching levels of significance for the following behaviours: consuming a healthy breakfast everyday, consuming the recommended types and amounts of vegetables and fruit, and replacing refined grains with whole grains. Notable between group differences in mean RE scores for the other recommended behaviours suggest they too may have been significant if the sample size were larger. In addition to the differences in RE, the mean SE score for avoiding SSB intake was significantly greater among women who attended the information session compared to those who did not attend. No significant between group differences were observed for the threat appraisal constructs (PV, PS) or intentions to engage in any of the

recommended diabetes prevention behaviours. While consumption of dark green leafy vegetables was significantly greater among attendees compared to non-attendees, lack of difference from baseline behaviours negated the influence of the information session.

Consistent with previous PMT research (Milne et al., 2000), the threat appraisal variables (i.e. PV, PS) appeared to be the most resistant to change in this PMT intervention. Failure to manipulate PV in this population may extend beyond the reasons previously cited in the literature, including the optimistic bias associated with the relatively young age of the participants (Schwarzer, 1994), as well as limited impact of fact-based risk information opposed to bogus, exaggerated risk information previously used in PMT research (Milne et al., 2000). Unlike participants of other PMT interventions, women in this study were explicitly informed about their increased risk of developing T2DM by a healthcare professional during their pregnancy. Accordingly, reinforcing this risk after pregnancy may have limited additional value.

Potential to significantly influence PS in this population following their GDM-affected pregnancy may also be limited. While education about the seriousness of developing T2DM was less explicit during the participants' prenatal care, this variable's seeming resistance to change may be due to the fact that these women have already experienced a form of diabetes during pregnancy. Milne and colleagues (2000) also propose that perceptions of risk severity are difficult to change, in general, because few people disagree that health-related risks are not serious.

The lack of between group differences in SE, outside of SSB avoidance, could be due to the complexity of the other recommended behaviours. Unlike avoidance of SSB intake, most of the other behaviours required a specialized skill set and, potentially, support from the woman's family. For example, replacing refined grains with whole grains requires knowledge about label reading, the ability to prepare whole grain foods, and may be influenced by family preferences since whole grains are typically prepared in large batches. Conversely, avoiding SSBs is more straightforward and is less likely to impact other family members. This finding suggests that an intervention that extends beyond

group discussion about how to overcome barriers to behaviour change is likely required to influence self-efficacy for most diabetes prevention behaviours.

Further, the apparent failure to manipulate intention may be due to the fact that intention could have waned over the two to three months between the intervention and when participants completed the final questionnaire. Also, the lack of significant difference in intention may be because participants likely had fairly strong intentions even before the intervention as suggested by the fact that between 65-75% of the non-attendees expressed positive intentions for each of the behaviours.

Considering the limited differences in intention between attendees and non-attendees, it is not surprising that no meaningful behaviour differences were observed between the groups. According to a meta-analysis of experimental evidence looking at the causal relationship between intention and behaviour (Webb and Sheeran, 2006), a medium to large change in intention (d=0.66) is required for a small to medium change in behaviour (d=0.36).

The intervention did, however, appear to significantly increase T2DM screening rates in this population, which identified elevated A1c values in several of participants. The importance of this increased T2DM screening rate cannot be overstated since the majority of women with pGDM do not typically complete the recommended postpartum diabetes screening (Smirnakis et al., 2005). In fact, previous research conducted at the SJHC Endocrine and Pregnancy clinic reported that less than 10% of clinic patients were screened for T2DM by six months postpartum as recommended by the Canadian Diabetes Association (Canadian Diabetes Association, 2008; MacLellan J, Watt A, McManus R, Giroux I, 2010)

The utility of the PMT model in predicting diabetes prevention behaviours

In our study, few PMT constructs reliably predicted intention and intention was not a consistently reliable predictor of concurrent diabetes prevention behaviours. Self efficacy was the construct that most consistently predicted intention and was a predictor for several diabetes prevention behaviours, independent of its association with intention. In

some cases, SE's predictive ability paralleled or exceeded that of intention. This finding is supported by previous T2DM prevention research, which found that self-efficacy was a significant predictor of both dietary and physical activity risk reduction behaviours in women with pGDM (Smith et al., 2005; Zehle et al., 2008; Kim et al., 2007a).

The intention-behaviour gap observed in this study is contradictory to the findings of Milne and colleagues (2000), whose meta-analysis of PMT research concluded that intention was a strong and robust predictor of concurrent behaviour. The disconnect between intention and behaviour observed in our study may be due to the external barriers, such as lack of time and competing parental priorities, that young mothers face when trying to engage in diabetes prevention behaviours.

Accordingly, augmenting PMT interventions with another theory that would bridge the gap between intention and behaviour may be of value in this population. Action planning, also known asforming an implementation intention, has proven to be an important precursor to effective behaviour change (Gollwitzer and Sheeran, 2006), including health-related behaviour change (Sheeran, Milne, Webb, Gollwitzer, 2005). Unlike forming basic intentions, which are essentially *"I intend to perform a certain behaviour or reach a certain outcome"*, implementation intention specifies when, where, and how a particular goal will be met (Gollwitzer, 1993, 1999).

Pairing the formation of implementation intentions with PMT- based interventions has proven to be a promising practice by Milne and colleagues (Milne, Orbell, & Paschal, 2002). More recently, Gaston and Prapavessis (2012) assessed the effectiveness of incorporating action and coping planning, through the Health Action Process Approach model (HAPA, Schwartzer, 1992, 2008), into a PMT-grounded intervention that was aimed at increasing exercise during pregnancy. This experimental study found that the group who only received the PMT intervention failed to maintain increased exercise levels four weeks following the intervention, where the groups who participated in the PMT intervention that was augmented with action or coping planning maintained a significantly greater level of exercise. In light of these findings, complimenting PMT with another theory that addresses implementation intentions, such HAPA, may serve to

bridge the apparent gap between intention and behaviour observed among our study participants. This type of theoretical pairing has also been encouraged by researchers to effectively influence complex nutrition and health behaviours, such as those recommended for T2DM prevention (AbuSabha, R. & Achterberg, C., 1997)

Lastly, the current format of the PMT intervention is not meeting the needs of a significant number of post-GDM patients. The most common reasons cited for not attending the information session revolved around lack of reliable transportation and being short on time, primarily due to the demands of parenthood. Providing more flexible, alternate forms of information sharing, such as over the phone, on-line, or on mobile devices, may improve participation in postnatal diabetes prevention programs among this group of women.

5.1 Limitations

While this research study is one of the few PMT-grounded interventions assessed in clinical practice and the first within this population, there are several limitations that warrant discussion. The first is that results can only be generalized to primarily Caucasian, middle class, English speaking women.

Secondly, the immediate impact of the information session on the PMT variables, intention, and behaviour remains unknown since participants did not complete the questionnaire until two to three months following the information session. The timing of this questionnaire did, however, support the assessment of PMT variables that were meaningfully changed (i.e., changes that lasted two months or longer).

Thirdly, the intervention's apparent failure to successfully manipulate the majority of PMT constructs across the behaviours significantly limits the assessment of the utility of the PMT model in predicting either intention or behaviour.

Fourth, while validated tools were used to measure the PMT constructs, measures for behaviour were not validated, with the exception of the Godin-Leisure Time Physical

Activity Questionnaire. Accordingly, the accuracy of the self-reported behaviours is questionable.

Lastly, and most importantly, poor pre-intervention questionnaire response rates prevented definitive conclusions to be drawn regarding actual changes in PMT variables, intention, or behaviour caused by the intervention. While there were no significant differences in total number of risk factors or demographic variables between attendees and non-attendees, we cannot rule out that there were confounding factors that were not accounted for in the analysis. Further, due to the voluntary nature of this routine post-partum appointment, self-selection bias also cannot be ruled out.

5.2 Conclusions

While this study cannot draw definitive conclusions about the effectiveness of the intervention or the predictive utility of the PMT model for this population, the results appear to confirm the need for custom diabetes prevention interventions for this unique population. Also, focusing on interventions that improve self-efficacy and implementation intention appears to be a promising practice for women with a recent history of GDM.

Future research is needed to verify the findings of this study and to further investigate the relationships between precursors to risk reduction behaviours in order to design effective diabetes prevention interventions for this unique population. Based on the findings of this study, integrating action planning into T2DM prevention interventions may be particularly useful for women with a recent history of GDM. The inconsistent and relatively weak relationship between basic intention and concurrent behaviour is not in agreement with the majority of PMT literature, suggesting that these women have unique mediators of behaviour change. This discovery, in addition to the well-cited barriers these women face in engaging in diabetes prevention behaviours (e.g., lack of time, poor family support), emphasize the need to test different interventions that address this intention-behaviour gap. Finally, the effectiveness of more flexible interventions, that can be accessed from home and the potential value of linking these women with structured

community programming to assist behaviour change, such as exercise or cooking classes, are worth investigating

5.3 Relevance to practice

To the best of our knowledge, this is the first diabetes prevention intervention for postnatal women that has been modeled after the PMT and assessed using the PMT model. While definitive conclusions cannot be drawn regarding the effectiveness of this intervention or the usefulness of the model, as a whole, in predicting diabetes prevention behaviours, it appears that it may be more beneficial to address coping appraisal beliefs, RE and SE, opposed to the threat appraisal beliefs. Accordingly, focusing more on RE and SE in place of the threat appraisal beliefs may lead to greater change in intentions and behaviours. The intention-behaviour gap observed in this study also supports the use of action planning to support goal attainment after the intention has been set. To make time to effectively address these components, the number of recommended behaviours could also be limited to the behaviours that have been proven to be the most effective at reducing T2DM risk or behaviours with the greatest potential of improvement. Feedback from non-attendees also highlighted some major barriers to participating in a hospital-based, in-person intervention, including poor access to transportation and competing parental demands. Addressing these barriers may improve participation in postpartum T2DM prevention interventions and could, in turn, further enhance A1c screening rates, which were significantly higher among those who attended this intervention.

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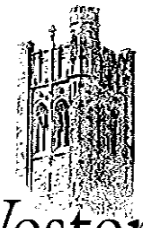
Appendix A: UWO Certificate of Approval of Human Research



Research Western

Use of Human Participants - Ethics Approval Notice

Principal Investigator: Dr. Isabelle Giroux
Review Number: 17074E
Review Level: Delegated
Approved Local Adult Participants: 80
Approved Local Minor Participants: 0
Protocol Title: Psychosocial factors related to diabetes prevention behaviours in women with a recent history of Gestational Diabetes (Families preventing diabetes research project)
Department & Institution: Unknown, Regional Mental Health Care London
Sponsor:
Ethics Approval Date: April 13, 2011 **Expiry Date:** July 31, 2012
Documents Reviewed & Approved & Documents Received for Information:

Document Name	Comments	Version Date
Revised UWO Protocol	The survey may also now be completed on-line.	
Other	Online Questionnaires 2 and 3.	
Other	Email Script - Questionnaire 1, 2, 3.	

This is to notify you that The University of Western Ontario Research Ethics Board for Health Sciences Research

Involving Human Subjects (HSREB) which is organized and operates according to the Tri-Council Policy Statement: Ethical Conduct of Research Involving Humans and the Health Canada/ICH Good Clinical Practice Practices: Consolidated Guidelines; and the applicable laws and regulations of Ontario has reviewed and granted approval to the above referenced revision(s) or amendment(s) on the approval date noted above. The membership of this REB also complies with the membership requirements for REB's as defined in Division 5 of the Food and Drug Regulations.

The ethics approval for this study shall remain valid until the expiry date noted above assuming timely and acceptable responses to the HSREB's periodic requests for surveillance and monitoring information. If you require an updated approval notice prior to that time you must request it using the UWO Updated Approval Request Form.

Members of the HSREB who are named as investigators in research studies, or declare a conflict of interest, do not participate in discussion related to, nor vote on, such studies when they are presented to the HSREB.

The Chair of the HSREB is Dr. Joseph Gilbert. The UWO HSREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000940.

Appendix B: Lawson Research Institute Ethics Board Approval

LAWSON HEALTH RESEARCH INSTITUTE

FINAL APPROVAL NOTICE

RESEARCH OFFICE REVIEW NO.: R-10-241

PROJECT TITLE: Psychosocial factors related to diabetes prevention behaviours in women with a recent history of Gestational Diabetes (Families preventing diabetes research project)

PRINCIPAL INVESTIGATOR: Dr. Isabelle Giroux

DATE OF REVIEW BY CRIC: June 23, 2010

Health Sciences REB#: 17074E

Please be advised that the above project was reviewed by the Clinical Research Impact Committee and the project:

Was Approved

PLEASE INFORM THE APPROPRIATE NURSING UNITS, LABORATORIES, ETC. BEFORE STARTING THIS PROTOCOL. THE RESEARCH OFFICE NUMBER MUST BE USED WHEN COMMUNICATING WITH THESE AREAS.

Dr. David Hill
V.P. Research
Lawson Health Research Institute

cc: Administration

Appendix C: Letter of Information and Consent

Letter of Information

RESEARCH TITLE
Psychosocial factors related to diabetes prevention behaviours in women with a recent history of Gestational Diabetes

SHORT TITLE: Families Preventing Diabetes Research Project

RESEARCHERS
Dr. Isabelle Giroux, PhD, RD, B.Ed., PHEc., Brescia University College (Supervisor)
Jennifer MacLellan, RD Brescia University College (Masters Student)
Dr. Paula Dworatzek PhD, RD, Brescia University College
Dr. Ruth McManus, MD, FRCP, Certified Endocrinologist

BACKGROUND

The purpose of this letter is to provide you with the information you need to make an informed decision about participating in this study. Please take the time to read this letter carefully and feel free to ask questions if anything is unclear or there are words or phrases you do not understand.

Investigators from Brescia University College at the University of Western Ontario (UWO) are conducting a research study with women who have been diagnosed with Gestational Diabetes (GDM) and are receiving care at St. Joseph's Health Care, London. The purpose of this study is to evaluate an information session called "Families Preventing Diabetes", which has been designed to help women reduce their risk of developing type 2 diabetes. The researchers also hope to identify attitudes and beliefs that support behaviours that may prevent or delay the development of type 2 diabetes.

WHO IS ELIGIBLE FOR THIS STUDY?

Women between the ages of 18 and 50 years, who have been diagnosed with GDM and are attending St. Joseph's Health Care, London are eligible to participate.

PARTICIPATION

If you decide to participate, you will be asked to complete the following:

1. **Questionnaire #1** between 34 to 40 weeks gestation which will take approximately 15 minutes to complete. If you choose to complete this questionnaire on-line, you will be e-mailed the link to the Survey Monkey™ on-line questionnaire. If you choose to complete the questionnaire in person, you will be provided with the questionnaire during a future clinic visit.

2. **Questionnaire #3** six to eight months from now, which will take approximately 20-30 minutes to complete. This questionnaire will be mailed or e-mailed to you and you will have the option of completing it and mailing it back in a postage paid envelop, completing it over the phone or completing an on-line version of the questionnaire via Survey Monkey™. If you do not wish to continue with the study, please mail the questionnaire back indicating that you do not wish to participate or respond via e-mail expressing your wishes.

   If we do not receive your response, you will be contacted up to three times within two months by the study's research assistant to remind you about the questionnaire and to offer you the option of completing the questionnaire over the phone.

3. If you choose to participate in the "Families Preventing Diabetes" information session four to five months from now, you will be asked to complete **Questionnaire #2** before the session. If you wish to complete the questionnaire online, a link to the Survey Monkey™ questionnaire will be e-mailed to you one week prior to the information session. This questionnaire will take approximately 20 minutes to complete. The Families Preventing Diabetes session will cover nutrition and lifestyle approaches to preventing diabetes for you and your family. These sessions will be held at the Diabetes Education Centre at St. Joseph's Hospital and will be led by a dietitian and a physician.

There are no known risks to you associated with your participation in this study. Your participation in this research project will not involve any additional costs. Benefits of participating in the research study include the opportunity to learn about diabetes prevention from local experts, access to useful handouts and child minding during the session. However, you may not benefit personally from your participation. You will also be compensated for the time you spend to completing the first and final questionnaire. This compensation will be in the form of a $15 Wal-Mart gift card, which will be mailed to you one week after we receive your final questionnaire. Approximately 80 women will participate in this study. You will be asked to sign a consent form to participate in this study.

WHAT WILL HAPPEN WITH THE INFORMATION YOU TELL US?

The researchers will keep your identity and information, as well as all questionnaires, confidential and secure. Codes will be used instead of names on all documents. A master list linking your unique research code to your name and contact information will be retained in the office of the Principle Investigator, along with your contact information. In accordance with the UWO Research Ethics Board, all data obtained, including the master list and contact information, will be stored in a secured computer system and files will be stored in locked filing cabinets. Questionnaires will be located in a locked office at Brescia University College, separate from the office where the master list and your contact information will be stored. All research documents will only be accessible by the principal investigator, co-investigator and research assistant. Data will be retained for 5 years after the study results have been published and will be destroyed at the end of that time. All computer data will be erased and all paper data will be shredded. When the results of the study are published, your name and personal information will not

appear within any of the reports. Representatives of The University of Western Ontario Health Sciences Research Ethics Board may contact you or require access to your study-related records to monitor the conduct of the research.

YOUR RIGHTS

Your participation in this research is voluntary and not required to attend your appointments at the hospital. You may refuse to participate, refuse to answer any questions, or withdraw from the study at any time with no effect on your future care. If you have any questions about your rights as a participant or the conduct of the study, you may contact the researchers Jennifer MacLellan and/or Isabelle Giroux. You may also contact Dr. Ruth McManus or Dr. David Hill, Scientific Director, Lawson Health Research Institute.

Thank you for your consideration and interest in participating in this study. This letter is yours to keep for future reference as well as a copy of the signed consent form.

Families Preventing Diabetes Research Project
Consent Form

I have read the letter of information for the research study on “Psychosocial factors related to diabetes prevention behaviours in women with a recent history of Gestational Diabetes”. I have had the nature of the study explained to me and I agree to participate. All questions have been answered to my satisfaction.

Name of participant: _____

Signature: _____

Date: _____

How would you like to receive the following questionnaires?

Questionnaire #1 (between 34-40 weeks pregnant)

___ In person or ___ E-mailed Link

Questionnaire #2 (4-5 months post-partum)

___ In person or ___ E-mailed Link

Questionnaire #3 (6-7 months post-partum)

___ Mailed or ___ E-mailed Link

Families Preventing Diabetes Research Project
Participant Contact Information

Please provide your contact information so that the research assistant can mail or Jennifer MacLellan can e-mail you a link to the study questionnaire and phone you to remind you about the questionnaire, if needed.

Name: _____

Street name and number: _____

City: _____

Postal Code: _____

Phone Number(s): _____

_____

E-mail: _____

Appendix D: Participant Questionnaire #1 (Q1)

If you agreed to participate in the Families Preventing Diabetes Research Project, please answer the following questions. This individual information is strictly confidential. Only averages from a large group will be reported at the end of data collection.

SECTION A. WEIGHT AND HEALTH HISTORY

1) **What is your age?** _____ years old

2) **What is your height?** _____ feet _____ inches, OR _____ centimeters

3) **What has your usual body weight been as an adult**?

_____ pounds, OR _____ kilograms **to** _____ pounds, OR _____ kilograms

4) **Did you have Gestational Diabetes in a previous pregnancy?** ◯ Yes ◯ No

If yes, in how many previous pregnancies did you develop Gestational Diabetes?

◯ 1 ◯ 2 ◯ 3 ◯ 4 ◯ 5 ◯ > 5

5) **Are you overweight?** ◯ Yes ◯ No

6) **Have you given birth to a baby that weighed over 4 kg or 9 lbs**? ◯ Yes ◯ No

If yes, how many of your children had a birth weight over 4 kg or 9 lbs?

◯ 1 ◯ 2 ◯ 3 ◯ 4 ◯ 5 ◯ > 5

7) **Have you been diagnosed with Polycystic Ovarian Syndrome?** ◯ Yes ◯ No

8) **Do you have a parent, brother or sister who has been diagnosed with Type 2 Diabetes?**
◯ Yes ◯ No

9) **Did you have high blood cholesterol before you became pregnant?** ◯ Yes ◯ No

10) **Did you have high blood pressure before you became pregnant?** ◯ Yes ◯ No

11) **Are you of Aboriginal, Hispanic, South Asian, Asian or African descent?** ◯ Yes ◯ No

12) **Have you been diagnosed with acanthosis nigricans (dark velvety patches of skin)?**
◯ Yes ◯ No

13) **How many times have you been pregnant (including this pregnancy)?**

0 ◯ 1 ◯ 2 ◯ 3 ◯ 4 ◯ 5 ◯ 6 ◯ 7 ◯ 8 ◯ 9 ◯ >9 ◯

14) **How many children did you deliver?**

0 ◯ 1 ◯ 2 ◯ 3 ◯ 4 ◯ 5 ◯ 6 ◯ 7 ◯ 8 ◯ 9 ◯ >9 ◯

SECTION B. CURRENT PREGNANCY INFORMATION

1) **How many weeks pregnant are you?** _____ weeks

2) **What was your weight immediately before this pregnancy?** _____ pounds, OR _____ kilograms

3) **What is your weight today?** _____ pounds, OR _____ kilograms

4) **What is your due date for this pregnancy?** _____ day _____ month

5) **How much weight did you gain during the first three months of your pregnancy?**

_____lb, OR _____ kg

6) **During what week of pregnancy were you first tested for Gestational Diabetes?** _____ week

7) **How was your Gestational Diabetesmanaged during this pregnancy?** Please check all that apply.

◯ Nutrition and diet changes

◯ Physical activity (like walking)

◯ Insulin

8) **If you required insulin during this pregnancy, what week of pregnancy did you start taking insulin?** _____ weeks

9) **Were you aware that you were at risk for developing Gestational Diabetes, before your developed the condition during this pregnancy?** ◯Yes ◯ No

10) **If you were aware of your risk, would you have been interested in receiving nutrition education to help you lower your risk for developing Gestationa l Diabetes?** ◯ Yes ◯ No

11) **Were you taking folic acid as a supplement or as part of a multivitamin and mineral supplement before you became pregnant?** ◯Yes ◯No

SECTION C. POSTPARTUM INFORMATION (After the birth of your child)

1) **On a scale from 0 to 100 percent(%), what do you think your risk (or chance) is of developing Type 2 Diabetes during after this pregnancy?**

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

2) **On a scale from 0 to 100 percent(%), what do you think your infant risk (or chance) is of developing Type 2 Diabetes during his or her lifetime?**

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

3) **On a scale from 0 to 100 percent(%), how concerned are you about <u>your</u> risk of developing Type 2 Diabetes and its associated complications?**

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

4) **On a scale from 0 to 100 percent(%), how concerned are you about <u>your infant's</u> risk of developing Type 2 Diabetes and its associated complications?**

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

5) **It is important to me to reduce <u>my</u> risk of developing Type 2 Diabetes.**

1	**2**	**3**	**4**	**5**
strongly disagree	disagree	neither agree or disagree	agree	strongly agree

6) **It is important to me to reduce <u>my infant's</u> risk of developing Type 2 Diabetes.**

1	**2**	**3**	**4**	**5**
strongly disagree	disagree	neither agree or disagree	agree	strongly agree

SECTION D. INFANT FEEDING

1) **Do you plan to breastfeed your baby?**

◯ Yes ◯ No → **Go to the Section E (Nutrition)**

If yes, for how many months after delivery do you plan to breastfeed?

◯ less than 1 month
◯ 1-3 months
◯ 4-6 months
◯ 7-9 months
◯ 10-12 months
◯ 13-24 months
◯ more than 24 months (2 years)

If yes, how many months after delivery are you planning to feed your baby breast milk only? (no formula or other foods/drinks)

◯ less than 1 month
◯ 1 -2 months
◯ 3-4 months
◯ 5 months
◯ 6 months
◯ 7 months
◯ 8 months
◯ More than 8 months

SECTION E. NUTRITION

1) **How helpful were the nutrition recommendations you received in managing your blood sugars during pregnancy?**

1	2	**3**	4	**5**	6	**7**
not helpful		somewhat helpful		moderately helpful		very helpful

2) **How often were you able to follow the nutrition recommendations provided to you?**

◯ Always ◯ Most of the time ◯ Half of the time ◯ Sometimes ◯ Never

3) **Did you eat or drink fruit or fruit juice yesterday?** ◯Yes ◯ No → **Go to question 2**

If yes, please list the fruit or fruit juice you ate or drank yesterday and the amount you ate or drank.

Description	**Amount** (e.g. 1 cup (250 mL/8 oz), 1 medium)
Example: frozen blueberries	*Example: ¼ cup*

4) **Did you eat or drink vegetables or vegetable juice yesterday?** ◯ Yes ◯ No → **Go to question 3**

If yes, please list the vegetable(s) or vegetable juice you ate or drank yesterday and the amount you ate or drank.

Description	**Amount** (e.g. 1 cup (250 mL/8 oz), 1 medium)
Example: broccoli, steamed	*Example: ½ cup*

Sugar Sweetened Beverages include regular pop, fruit drinks, sports drinks, hot chocolate, sugar sweetened energy drinks

5) **How many cups of <u>sugar sweetened beverages</u> do you drink on a typical day? (1 cup= 250 mL)**

◯ Less than ½ cup ◯ 2 cups ◯ 5 cups

◯ ½ cup ◯ 3 cups ◯ 6 cups

◯ 1 cup ◯ 4 cups ◯ More than 6 cups

6) **How many cups of <u>100% pure fruit juice</u> do you drink on a typical day?**

◯ Less than ½ cup	◯ 2 cups	◯ 5 cups
◯ ½ cup	◯ 3 cups	◯ 6 cups
◯ 1 cup	◯ 4 cups	◯ More than 6 cups

Breakfast = a meal that is eaten within 2 hours of waking up

7) **How many days did you eat breakfast during the LAST 7 DAYS?**

◯ none	◯ 2 days	◯ 4 days	◯ 6 days
◯ 1 day	◯ 3 days	◯ 5 days	◯ 7 days

8) **How often do you look at the nutrition label on products before you buy them?**

◯ Always ◯ Most of the time ◯ Half of the time ◯ Sometimes ◯ Never → **Go to Section I**

9) **If you look at nutrition labels, what are you looking for?** Please check all that apply.

◯ Total carbohydrates	◯ Saturated fat
◯ Sugar	◯ Total fat
◯ Fibre	◯ Protein
◯ Trans Fat	◯ Ingredients list

◯ Other (please specify) _____

10) **How often do you choose the healthier product based on this information?**

◯ Always ◯ Most of the time ◯ Half of the time ◯ Sometimes ◯ Never

SECTION F. PHYSCIAL ACTIVITY

1) **Did you receive advice from a health care professional about how to use physical activity to manage your blood sugars?**

◯ Yes, please specify _____ ◯ No ◯ Don't remember

2) **How helpful were the physical activity recommendations in managing your blood sugars during pregnancy?**

1	**2**	**3**	**4**	**5**	**6**	**7**
not helpful		somewhat helpful		moderately helpful		very helpful

Physical activity = activity that lasts for at least 10 minutes at a time (e.g. brisk walking, jogging, aerobics, swimming, dancing, climbing stairs, jumping rope, cycling, rowing, brisk yard work)

3) **During the LAST 7 DAYS, how many days did you engage in <u>at least 30 minutes</u> of physical activity?**

◯ none ◯ 2 days ◯ 4 days ◯ 6 days

◯ 1 day ◯ 3 days ◯ 5 days ◯ 7 days

4) **Were you advised by your doctor to avoid physical activity during pregnancy?**
◯ Yes ◯ No ◯ Don't remember

SECTION G. BLOOD GLUCOSE MONITORING

1) **How helpful was blood glucose monitoring (finger poke) in managing your glucose during pregnancy.** Please circle the number that applies to you.

1	**2**	**3**	**4**	**5**	**6**	**7**
not helpful		somewhat helpful		moderately helpful		very helpful

SECTION H. PLANNING ANOTHER PREGNANCY

1) **Do you plan to become pregnant again?** Please check one answer.

   ◯ Yes

   ◯ Uncertain

   ◯ No, please go to *Section I: Before this pregnancy*

2) **In your opinion, what do you think your risk is of developing Gestational Diabetes during your next pregnancy?**

1	**2**	**3**	**4**	**5**	**6**	**7**
no risk		small risk		moderate risk		high risk

3) **How concerned are you about your risk of developing Gestational Diabetes during your next pregnancy?**

1	**2**	**3**	**4**	**5**	**6**	**7**
not concerned		somewhat concerned		moderately concerned		very concerned

4) **It is important to me to reduce my risk of developing Gestational Diabetes during my next pregnancy.**

1	**2**	**3**	**4**	**5**
strongly disagree	disagree	neither agree or disagree	agree	strongly agree

SECTION I: BEFORE THIS PREGNANCY

1) **Did you have a family doctor before this pregnancy?** ◯ Yes ◯ No

2) **Did you ask your doctor for advice about having a healthy pregnancy before becoming pregnant?**
   ◯ Yes ◯ No

3) **Would you have seen a dietitian before this pregnancy, if you knew you were at risk for developing Gestational Diabetes?**

◯ Yes, I would have liked to see a dietitian had I known that I was at risk

◯ Yes, I was aware of my risk and I chose to see a dietitian

◯ No

4) **<u>Before</u> this pregnancy, did your doctor tell you that you were at risk for Gestational Diabetes?**
◯ Yes ◯ No ◯ Don't know

5) **<u>During</u> this pregnancy, did your doctor tell you that you were at risk for Gestational Diabetes?**
◯ Yes ◯ No ◯ Don't know

6) **<u>Before</u> this pregnancy, did your doctor advise you to take folic acid?** ◯ Yes ◯ No

7) **<u>Before</u> this pregnancy, did your doctor advise you about any of the following:**

a. A healthy pre-pregnancy weight for you ◯ Yes ◯ No

b. The amount of weight you should gain <u>during</u> your pregnancy ◯ Yes ◯ No

c. The amount of exercise you should get <u>before</u> your pregnancy ◯ Yes ◯ No

d. The amount of exercise you should get <u>during</u> your pregnancy ◯ Yes ◯ No

e. The types of foods to eat <u>before</u> your pregnancy ◯ Yes ◯ No

f. The types of foods you should eat <u>during</u> your pregnancy ◯ Yes ◯ No

SECTION J: DEMOGRAPHIC INFORMATION

The following questions will assist us in grouping your answers with others similar to you.

1) **What is the highest level of education you have completed ?**

◯ Elementary school ◯ High school ◯ College ◯ University (Undergraduate) ◯ University (Graduate)

2) **What is your household income before tax?**

◯ less than $15 000

◯ $ 15 000 - $ 29 999

◯ $ 30 000 - $ 44 999

◯ $ 45 000 - $ 59 999

◯ Choose not to answer to this question

◯ $ 60 000 - $ 79 999

◯ $ 80 000 - $ 99 999

◯ $100, 000 - $ 119, 999

◯ More than $ 120, 000

3) **How many adults are supported by this household income (including yourself)?**

◯ 1 ◯ 2 ◯ 3 ◯ 4 ◯ 5 ◯ 6 ◯ more than 6

4) **How many children are supported by this household income?**

◯ 1 ◯ 2 ◯ 3 ◯ 4 ◯ 5 ◯ 6 ◯ more than 6

Please specify their ages of your children

_____

Thank you for your time and assistance.
Your answers will help us better meet the needs of women who have had Gestational Diabetes.

Appendix E: Participant Questionnaire #2

If you agreed to participate in the Families Preventing Diabetes Research Project, please answer the following questions. This individual information is strictly confidential. Only averages from a large group will be reported at the end of data collection.

SECTION A: TYPE 2 DIABETES

1) **On a scale from 0 to 100 percent (%), what do you think your risk (or chance) is of developing Type 2 Diabetes**

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

2) **On a scale from 0 to 100 percent (%), what do you think your infant's risk (or chance) is of developing Type 2 Diabetes during his or her lifetime?**

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

3) **Personally, I feel vulnerable to developing Type 2 Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

4) **I think it is likely that I will develop Type 2 Diabetes**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

5) **Compared to the average person, I feel that my chance of developing Type 2 Diabetes is:**

1	2	3	4	5	6	7
Much Lower	Lower	Slightly Lower	About the Same	Slightly Higher	Moderately Higher	Much Higher

6) **I feel that it would be very serious for me to develop Type 2 Diabetes**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agre

7) **If you developed Type 2 Diabetes, how much would it interfere with you leading a normal life?**

1	2	3	4	5	6	7
Not at all			Moderately			Very Much

8) **The thought of developing Type 2 Diabetes scares me.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

SECTION B: DIABETES TESTING

1) **Have you been tested for diabetes since your most recent pregnancy?**

◯ Yes ◯ No ◯ Don't know

If yes, what was the result? ◯ Diabetes ◯ Prediabetes ◯ Normal ◯ I was not told

2) **Do you plan to be tested for Type 2 Diabetes in the future?**

◯ Yes ◯ No ◯ Undecided

If yes, when do you plan to be tested? (Check all that apply)

◯ within 6 months of my most recent birth
◯ before my next pregnancy
◯ every year
◯ every 2 years
◯ every 5 years
◯ don't know

SECTION C: YOUR NEXT PREGNANCY

1) **Is it possible that you could become pregnant again?**

◯ Yes ◯ Uncertain ◯ No → **Go to Section D (Infant Feeding)** - see below

2) **On a scale from 0 to 100 percent(%), what do you think your risk (or chance) is of developing Gestational diabetes during your next pregnancy**

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

3) **Personally, I feel vulnerable to developing Gestational Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

4) **I think it is likely that I will develop Gestational Diabetes**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

5) **Compared to the average person, I feel that my chance of developing Gestational Diabetes is:**

1	2	3	4	5	6	7
Much Lower	Lower	Slightly Lower	About the Same	Slightly Higher	Moderately Higher	Much Higher

6) **I feel that it would be very serious for me to develop Gestational Diabetes**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

7) **If you developed Gestational Diabetes, how much would it interfere with you leading a normal pregnancy?**

1	2	3	4	5	6	7
Not at all			Moderately			Very Much

8) **The thought of developing Gestational Diabetes scares me.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

9) **If you were to become pregnant again, when would you first request to be tested for Gestational Diabetes?**

◯ Before 13 weeks of pregnancy ◯ 13-18 weeks of pregnancy ◯ 19-23 weeks of pregnancy

◯ 24-28 weeks of pregnancy ◯ After 29 weeks of pregnancy ◯ Don't know

◯ I would not ask to be tested

SECTION D: INFANT FEEDING

1) **Are you currently breastfeeding?** ◯ Yes ◯ No

2) **Currently, is your infant consuming any infant formula?** ◯ Yes ◯ No

3) **Is your baby consuming any other foods or drinks, other than breast milk or formula?**

◯ Yes ◯ No

4) **When do you plan to introduce foods other than breast milk, infant formula or water to your infant?**

◯ 1 month of age	◯ 4 months of age	◯ 7 months of age
◯ 2 months of age	◯ 5 months of age	◯ 8 months of age
◯ 3 months of age	◯ 6 months of age	◯ Don't know

5) **If you became pregnant again, how long would you plan to exclusively breastfeed your infant ?**

◯ I do not plan to breast feed	◯ 3 months	◯ 6 months
◯ 1 month	◯ 4 months	◯ 7 months
◯ 2 months	◯ 5 months	◯ Don't know

6) **Breastfeeding your infant may: (Check all that apply)**

- ◯ Reduce your risk for developing Type 2 Diabetes
- ◯ Reduce your risk of developing Gestational Diabetes
- ◯ Reduce your infant's risk of developing Type 2 Diabetes
- ◯ Don't know

SECTION E: VEGETABLES AND FRUIT

1) **Did you eat or drink fruit or fruit juice yesterday?** ◯Yes ◯ No → **Go to question 2**

If yes, please list the fruit or fruit juice you ate or drank yesterday and the amount you ate or drank.

Description	**Amount** (e.g. 1 cup (250 mL/8 oz), 1 medium)
Example: frozen blueberries	*Example: ¼ cup*

2) **Did you eat or drink vegetables or vegetable juice yesterday?** ◯ Yes ◯ No → **Go to question 3**

If yes, please list the vegetable(s) or vegetable juice you ate or drank yesterday and the amount you ate or drank.

Description	**Amount** (e.g. 1 cup (250 mL/8 oz), 1 medium)
Example: broccoli, steamed	*Example: ½ cup*

3) **I feel that consuming vegetables and fruit, including dark green leafy vegetables, would help me to personally reduce my risk of Type 2 Diabetes**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

4) **How effective do you feel consuming vegetables and fruit , including dark green leafy vegetables, would be for reducing your risk of Type 2 Diabetes?**

1	2	3	4	5	6	7
Not at all Effective		Slightly Effective		Moderately Effective		Extremely Effective

5) **I feel that the evidence linking vegetable and fruit consumption , including dark green leafy vegetables, to Type 2 Diabetes risk reduction is very strong**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

6) **For me to consume the types and amounts of vegetables and fruit necessary to reduce my risk of developing Type 2 Diabetes would be:**

1	2	3	4	5	6	7
Extremely Difficult			Moderately Difficult/Easy			Extremely Easy

7) **If I wanted to I could easily consume the types and amounts of vegetables and fruit necessary to reduce my risk of developing Type 2 Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

8) **How confident are you that you are capable of consuming the recommended types and amounts of vegetables and fruit necessary to reduce your risk of developing Type 2 Diabetes?**

1	2	3	4	5	6	7
Not at all Confident			Moderately Confident			Completely Confident

9) **Do you plan to consume vegetables and fruit, including dark green leafy vegetables, to reduce your risk of Type 2 Diabetes.**

1	2	3	4	5	6	7
Definitely not			Maybe			Definitely

SECTION F: SUGAR SWEETENED BEVERAGES

"Sugar Sweetened Beverages" include regular pop, fruit drinks, sports drinks, hot chocolate, sugar sweetened energy drinks and any other beverage that contains added sugars

1) **How many cups of sugar sweetened beverages do you drink on a typical day? (1 cup=250 mL)**

◯ Less than ½ cup	◯ 2 cups	◯ 5 cups
◯ ½ cup	◯ 3 cups	◯ 6 cups
◯ 1 cup	◯ 4 cups	◯ More than 6 cups

2) **I feel that avoiding sugar sweetened beverages would help me to personally reduce my risk of Type 2 Diabetes**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

3) **How effective do you feel avoiding sugar sweetened beverages would be for reducing your risk of Type 2 Diabetes**

1	2	3	4	5	6	7
Not at all Effective		Slightly Effective		Moderately Effective		Extremely Effective

4) **I feel that the evidence linking sugar sweetened beverages consumption to Type 2 Diabetes risk is very strong**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

5) **For me to reduce my sugar sweetened beverages intake to the amount necessary to reduce my risk of developing Type 2 Diabetes would be:**

1	2	3	4	5	6	7
Extremely Difficult			Moderately Difficult/Easy			Extremely Easy

6) **If I wanted to I could easily reduce my sugar sweetened beverages intake to the amount necessary to reduce my risk of developing Type 2 Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

7) **How confident are you that you are capable of reducing your sugar sweetened beverages intake to the amount necessary to reduce your risk of developing Type 2 Diabetes?**

1	2	3	4	5	6	7
Not at all Confident			Moderately Confident			Completely Confident

8) **Do you plan to avoid sugar sweetened beverage to reduce your risk of Type 2 Diabetes.**

1	2	3	4	5	6	7
Definitely not			Maybe			Definitely

SECTION G: BREAKFAST

A "Healthy Breakfast" is a meal consisting of high fibre, lower fat foods that is eaten within 2 hours of waking up

1) **How many days did you eat a healthy breakfast during the LAST 7 DAYS?**

◯ none ◯ 2 days ◯ 4 days ◯ 6 days

◯ 1 day ◯ 3 days ◯ 5 days ◯ 7 days

2) **I feel that consuming a healthy breakfast would help me to personally reduce my risk of Type 2 Diabetes**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

3) **How effective do you feel consuming a healthy breakfast would be for reducing your risk of Type 2 Diabetes**

1	2	3	4	5	6	7
Not at all Effective		Slightly Effective		Moderately Effective		Extremely Effective

4) **I feel that the evidence linking the consumption of a healthy breakfast to Type 2 Diabetes risk reduction is very strong**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

5) **For me to consume a healthy breakfast often enough to reduce my risk of developing Type 2 Diabetes would be:**

1	2	3	4	5	6	7
Extremely Difficult			Moderately Difficult/Easy			Extremely Easy

6) **If I wanted to I could easily consume a healthy breakfast often enough to reduce my risk of developing Type 2 Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

7) **How confident are you that you are capable of consuming a healthy breakfast often enough to reduce your risk of developing Type 2 Diabetes?**

1	2	3	4	5	6	7
Not at all Confident			Moderately Confident			Completely Confident

8) **Do you plan to consume a healthy breakfast daily to reduce your risk of Type 2 Diabetes.**

1	2	3	4	5	6	7
Definitely not			Maybe			Definitely

SECTION H: LABEL READING

1) **How often do you look at the nutrition label on products before you buy them?**

◯ Always ◯ Most of the time ◯ Half of the time ◯ Sometimes ◯ Never → **Go to Section I**

2) **If you look at nutrition labels, what are you looking for?** Please check all that apply.

◯ Total carbohydrates
◯ Sugar
◯ Fibre
◯ Trans Fat
◯ Saturated fat
◯ Total fat
◯ Protein
◯ Ingredients list
◯ Other (please specify) _____

3) **How often do you choose the healthier product based on this information?**

◯ Always ◯ Most of the time ◯ Half of the time ◯ Sometimes ◯ Never

Grains

1) **I feel that replacing refined grains with whole grains would help me to personally reduce my risk of Type 2 Diabetes**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

2) **How effective do you feel replacing refined grains with whole grains would be for reducing your risk of Type 2 Diabetes**

1	2	3	4	5	6	7
Not at all Effective		Slightly Effective		Moderately Effective		Extremely Effective

3) **I feel that the evidence linking whole grains to Type 2 Diabetes risk reduction is very strong**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

4) **For me to replace refined grains with whole grains often enough to reduce my risk of developing Type 2 Diabetes would be:**

1	2	3	4	5	6	7
Extremely Difficult			Moderately Difficult/Easy			Extremely Easy

5) **If I wanted to I could easily replace refined grains with whole grains often enough to reduce my risk of developing Type 2 Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

6) **How confident are you that you are capable of replacing refined grains with whole grains often enough to reduce your risk of developing Type 2 Diabetes?**

1	2	3	4	5	6	7
Not at all Confident			Moderately Confident			Completely Confident

7) **Do you plan to replace refined grains with whole grains to reduce your risk of Type 2 Diabetes.**

1	2	3	4	5	6	7
Definitely not			Maybe			Definitely

Fats

---

1) **I feel that replacing saturated and trans fats with unsaturated fats would help me to personally reduce my risk of Type 2 Diabetes**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

2) **How effective do you feel replacing saturated and trans fats with unsaturated fats would be for reducing your risk of Type 2 Diabetes**

1	2	3	4	5	6	7
Not at all Effective		Slightly Effective		Moderately Effective		Extremely Effective

3) **I feel that the evidence linking saturated and trans fats to Type 2 Diabetes risk reduction is very strong**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

4) **For me to replace saturated and trans fats with unsaturated fats often enough to reduce my risk of developing Type 2 Diabetes would be:**

1	2	3	4	5	6	7

Extremely Difficult	Moderately Difficult/Easy	Extremely Easy

5) **If I wanted to I could easily replace saturated and trans fats with unsaturated fats often enough to reduce my risk of developing Type 2 Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

6) **How confident are you that you are capable of replacing saturated and trans fats with unsaturated fats often enough to reduce your risk of developing Type 2 Diabetes?**

1	2	3	4	5	6	7
Not at all Confident			Moderately Confident			Completely Confident

7) **Do you plan to replace saturated and trans fat with unsaturated fat to reduce your risk of Type 2 Diabetes.**

1	2	3	4	5	6	7
Definitely not			Maybe			Definitely

SECTION I: PHYSICAL EXERCISE

1) **During a typical 7-day period (a week), how many times on average do you do the following kinds of exercise for more than 10 minutes during your free-time (write on each line the appropriate number)**

Times Per Week

(a) STENUOUS EXERCISE (HEART BEATS RAPIDLY)
(i.e. running, jogging, cross country skiing, vigorous swimming, vigorous long distance long distance bicycling) _____

(b) MODERATE EXERCISE (NOT EXHAUSTING)
(i.e. fast walking, easy bicycling, easy swimming, popular and folk dancing) _____

(c) MILD EXERCISE (MINIMAL EFFORT)
(i.e. yoga, archery, fishing from river back, bowling, horseshoes, golf, easy walking) _____

2) **During a typicall 7 day period (a week), in your leisure-time, how often do you engage in any regular activity long enough to work up a sweat (heart beats rapidly)?**

1. OFTEN **2. SOMETIMES** **3. NEVER/RARELY**

○ ○ ○

3) **I feel that physical exercise would help me to personally reduce my risk of Type 2 Diabetes**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

4) **How effective do you feel physical exercise would be for reducing your risk of Type 2 Diabetes**

1	2	3	4	5	6	7
Not at all Effective		Slightly Effective		Moderately Effective		Extremely Effective

5) **I feel that the evidence linking physical exercise to Type 2 Diabetes risk reduction is very strong**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

6) **For me do the types and amount of physical exercise necessary to reduce my risk of developing Type 2 Diabetes would be:**

1	2	3	4	5	6	7
Extremely Difficult			Moderately Difficult/Easy			Extremely Easy

7) **If I wanted to I could easily do the types and amount of physical exercise necessary to reduce my risk of developing Type 2 Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

8) **How confident are you that you are capable of doing the types and amount of physical exercise to reduce your risk of developing Type 2 Diabetes?**

1	2	3	4	5	6	7
Not at all Confident			Moderately Confident			Completely Confident

9) **Do you plan to start an exercise program to reduce your risk of Type 2 Diabetes?**

1	2	3	4	5	6	7
Definitely not			Maybe			Definitely

1) **What is your most recent body weight?** _____ lb _____ kg ◯ Don't know

2) **When was the last time you had your body weight taken?** _____

3) **I feel that losing weight or maintaining a healthy weight would help me to personally reduce my risk of Type 2 Diabetes**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

4) **How effective do you feel losing weight or maintaining a healthy weight would be for reducing your risk of Type 2 Diabetes**

1	2	3	4	5	6	7
Not at all Effective		Slightly Effective		Moderately Effective		Extremely Effective

5) **I feel that the evidence linking healthy body weight to Type 2 Diabetes risk reduction is very strong**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

6) **For me maintaining a healthy body weight or losing the necessary amount of weight to reduce my risk of developing Type 2 Diabetes would be:**

1	2	3	4	5	6	7
Extremely Easy			Moderately Easy/Difficult			Extremely Difficult

7) **If I wanted to I could easily maintain a healthy body weight or lose the amount of weight necessary to reduce my risk of developing Type 2 Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

8) **How confident are you that you are capable of maintaining a healthy body weight or losing the amount of weight necessary to reduce your risk of developing Type 2 Diabetes?**

1	2	3	4	5	6	7
Not at all Confident			Moderately Confident			Completely Confident

10) **Do you plan to lose at least 5-7% of your body weight to reduce your risk of Type 2 Diabetes.**

1	2	3	4	5	6	7
Definitely not			Maybe			Definitely

Thank you for your time and assistance.
Your answers will help us better meet the needs of women who have had Gestational Diabetes.

Appendix F: Participant Questionnaire #3A

If you agreed to participate in the Families Preventing Diabetes Research Project, please answer the following questions. This individual information is strictly confidential. Only averages from a large group will be reported at the end of data collection.

SECTION A: TYPE 2 DIABETES

1) **On a scale from 0 to 100 percent (%), what do you think your risk (or chance) is of developing Type 2 Diabetes**

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

2) **On a scale from 0 to 100 percent (%), what do you think your infant's risk (or chance) is of developing Type 2 Diabetes during his or her lifetime?**

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

3) **Personally, I feel vulnerable to developing Type 2 Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

4) **I think it is likely that I will develop Type 2 Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

5) **Compared to the average person, I feel that my chance of developing Type 2 Diabetes is:**

1	2	3	4	5	6	7
Much Lower	Lower	Slightly Lower	About the Same	Slightly Higher	Moderately Higher	Much Higher

6) **I feel that it would be very serious for me to develop Type 2 Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

7) **If you developed Type 2 Diabetes, how much would it interfere with you leading a normal life?**

1	2	3	4	5	6	7
Not at all			Moderately			Very Much

8) **The thought of developing Type 2 Diabetes scares me.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

SECTION B: DIABETES TESTING

1) **Have you been tested for diabetes since your most recent pregnancy?**

◯ Yes ◯ No ◯ Don't know

If yes, what was the result? ◯ Diabetes ◯ Prediabetes ◯ Normal ◯ I was not told

2) **Do you plan to be tested for Type 2 Diabetes in the future?**

◯ Yes ◯ No ◯ Undecided

If yes, when do you plan to be tested? (Check all that apply)

◯ within 6 months of my most recent birth
◯ before my next pregnancy
◯ every year
◯ every 2 years
◯ every 5 years
◯ don't know

SECTION C: YOUR NEXT PREGNANCY

1) **Is it possible that you could become pregnant again?**

◯ Yes ◯ Uncertain ◯ No → **Go to Section D (Infant Feeding)** - see below

2) **On a scale from 0 to 100 percent (%), what do you think your risk (or chance) is of developing Gestational diabetes during your next pregnancy.**

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

3) **Personally, I feel vulnerable to developing Gestational Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

4) **I think it is likely that I will develop Gestational Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

5) **Compared to the average person, I feel that my chance of developing Gestational Diabetes is:**

1	2	3	4	5	6	7
Much Lower	Lower	Slightly Lower	About the Same	Slightly Higher	Moderately Higher	Much Higher

6) **I feel that it would be very serious for me to develop Gestational Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

7) **If you developed Gestational Diabetes, how much would it interfere with you leading a normal pregnancy?**

1	2	3	4	5	6	7
Not at all			Moderately			Very Much

8) **The thought of developing Gestational Diabetes scares me.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

9) **If you were to become pregnant again, when would you first request to be tested for Gestational Diabetes?**

◯ Before 13 weeks of pregnancy ◯ 13-18 weeks of pregnancy ◯ 19-23 weeks of pregnancy

◯ 24-28 weeks of pregnancy ◯ After 29 weeks of pregnancy ◯ Don't know

◯ I would not ask to be tested

SECTION D: INFANT FEEDING

1) **Are you currently breastfeeding?** ◯ Yes ◯ No

2) **Currently, is your infant consuming any infant formula?** ◯ Yes ◯ No

3) **Is your baby consuming any other foods or drinks, other than breast milk or formula?**

◯ Yes ◯ No

4) **When do you plan to introduce foods other than breast milk, infant formula or water to your infant?**

◯ 1 month of age ◯ 4 months of age ◯ 7 months of age

◯ 2 months of age ◯ 5 months of age ◯ 8 months of age

◯ 3 months of age ◯ 6 months of age ◯ Don't know

If you became pregnant again, how long would you exclusively breastfeed your infant ?

◯ I do not plan to breast feed	◯ 3 months	◯ 6 months
◯ 1 month	◯ 4 months	◯ 7 months
◯ 2 months	◯ 5 months	◯ Don't know

5) **Breastfeeding your infant may:** (Check all that apply)

- ◯ Reduce your risk for developing Type 2 Diabetes
- ◯ Reduce your risk of developing Gestational Diabetes
- ◯ Reduce your infant's risk of developing Type 2 Diabetes
- ◯ Don't know

SECTION E: VEGETABLES AND FRUIT

1) **Did you eat or drink fruit or fruit juice yesterday?** ◯ Yes ◯ No → **Go to question 2**

If yes, please list the fruit or fruit juice you ate or drank yesterday and the amount you ate or drank.

Description	**Amount** (e.g. 1 cup (250 mL/8 oz), 1 medium)
Example: frozen blueberries	*Example: ¼ cup*

2) **Did you eat or drink vegetables or vegetable juice yesterday?**
◯Yes ◯ No → **Go to question 3**

If yes, please list the vegetable(s) or vegetable juice you ate or drank yesterday and the amount you ate or drank.

Description	**Amount** (e.g. 1 cup (250 mL/8 oz), 1 medium)
Example: broccoli, steamed	*Example: ½ cup*

3) **I feel that consuming vegetables and fruit, including dark green leafy vegetables, would help me to personally reduce my risk of Type 2 Diabetes**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

4) **How effective do you feel consuming vegetables and fruit , including dark green leafy vegetables, would be for reducing your risk of Type 2 Diabetes?**

1	2	3	4	5	6	7
Not at all Effective		Slightly Effective		Moderately Effective		Extremely Effective

5) **I feel that the evidence linking vegetable and fruit consumption, including dark green leafy vegetables, to Type 2 Diabetes risk reduction is very strong**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

6) **For me to consume the types and amounts of vegetables and fruit necessary to reduce my risk of developing Type 2 Diabetes would be:**

1	2	3	4	5	6	7
Extremely Difficult			Moderately Difficult/Easy			Extremely Easy

7) **If I wanted to, I could easily consume the types and amounts of vegetables and fruit necessary to reduce my risk of developing Type 2 Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

8) **How confident are you that you are capable of consuming the recommended types and amounts of vegetables and fruit necessary to reduce your risk of developing Type 2 Diabetes?**

1	2	3	4	5	6	7
Not at all Confident			Moderately Confident			Completely Confident

9) **Do you plan to consume vegetables and fruit, including dark green leafy vegetables, to reduce your risk of Type 2 Diabetes?**

1	2	3	4	5	6	7
Definitely not			Maybe			Definitely

SECTION F: SUGAR SWEETENED BEVERAGES

"Sugar Sweetened Beverages" include regular pop, fruit drinks, sports drinks, hot chocolate, sugar sweetened energy drinks and any other beverage that contains added sugars

1) **How many cups of sugar sweetened beverages do you drink on a typical day? (1 cup=250 mL)**

◯ Less than ½ cup	◯ 2 cups	◯ 5 cups
◯ ½ cup	◯ 3 cups	◯ 6 cups
◯ 1 cup	◯ 4 cups	◯ More than 6 cups

2) **I feel that avoiding sugar sweetened beverages would help me to personally reduce my risk of Type 2 Diabetes**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

3) **How effective do you feel avoiding sugar sweetened beverages would be for reducing your risk of Type 2 Diabetes**

1	2	3	4	5	6	7
Not at all Effective		Slightly Effective		Moderately Effective		Extremely Effective

4) **I feel that the evidence linking sugar sweetened beverage consumption to Type 2 Diabetes risk is very strong**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

5) **For me to reduce my sugar sweetened beverages consumption to the amount necessary to reduce my risk of developing Type 2 Diabetes would be:**

1	2	3	4	5	6	7
Extremely Difficult			Moderately Difficult/Easy			Extremely Easy

6) **If I wanted to I could easily reduce my sugar sweetened beverages intake to the amount necessary to reduce my risk of developing Type 2 Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

7) **How confident are you that you are capable of reducing your sugar sweetened beverages intake to the amount necessary to reduce your risk of developing Type 2 Diabetes?**

1	2	3	4	5	6	7
Not at all Confident			Moderately Confident			Completely Confident

8) **Do you plan to avoid sugar sweetened beverages to reduce your risk of Type 2 Diabetes?**

1	2	3	4	5	6	7
Definitely not			Maybe			Definitely

SECTION G: BREAKFAST

A **"Healthy Breakfast"** is a meal consisting of high fibre, lower fat foods that is eaten within 2 hours of waking up

1) **How many days did you eat a healthy breakfast during the LAST 7 DAYS?**

◯ none	◯ 2 days	◯ 4 days	◯ 6 days
◯ 1 day	◯ 3 days	◯ 5 days	◯ 7 days

2) **I feel that consuming a healthy breakfast would help me to personally reduce my risk of Type 2 Diabetes**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

3) **How effective do you feel consuming a healthy breakfast would be for reducing your risk of Type 2 Diabetes**

1	2	3	4	5	6	7
Not at all Effective		Slightly Effective		Moderately Effective		Extremely Effective

4) **I feel that the evidence linking the consumption of a healthy breakfast to Type 2 Diabetes risk reduction is very strong**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

5) **For me to consume a healthy breakfast often enough to reduce my risk of developing Type 2 Diabetes would be:**

1	2	3	4	5	6	7
Extremely Difficult			Moderately Difficult/Easy			Extremely Easy

6) **If I wanted to I could easily consume a healthy breakfast often enough to reduce my risk of developing Type 2 Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

7) **How confident are you that you are capable of consuming a healthy breakfast often enough to reduce your risk of developing Type 2 Diabetes?**

1	2	3	4	5	6	7
Not at all Confident			Moderately Confident			Completely Confident

8) **Do you plan to consume a healthy breakfast daily to reduce your risk of Type 2 Diabetes?**

1	2	3	4	5	6	7
Definitely not			Maybe			Definitely

SECTION H: LABEL READING AND FOOD SELECTION

1) **How often do you look at the nutrition label on products before you buy them?**

◯ Always ◯ Most of the time ◯ Half of the time ◯ Sometimes ◯ Never

2) **If you look at nutrition labels, what are you looking for?** Please check all that apply.

◯ Total carbohydrates
◯ Sugar
◯ Fibre
◯ Trans Fat
◯ Saturated fat
◯ Total fat
◯ Protein
◯ Ingredients list
◯ Other (please specify) _____

3) **How often do you choose the healthier product based on this information?**

◯ Always ◯ Most of the time ◯ Half of the time ◯ Sometimes ◯ Never

GRAINS

1) **I feel that replacing refined grains with whole grains would help me to personally reduce my risk of Type 2 Diabetes**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

2) **How effective do you feel replacing refined grains with whole grains would be for reducing your risk of Type 2 Diabetes**

1	2	3	4	5	6	7
Not at all Effective		Slightly Effective		Moderately Effective		Extremely Effective

3) **I feel that the evidence linking whole grains to Type 2 Diabetes risk reduction is very strong**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

4) **For me to replace refined grains with whole grains often enough to reduce my risk of developing Type 2 Diabetes would be:**

1	2	3	4	5	6	7
Extremely Difficult			Moderately Difficult/Easy			Extremely Easy

5) **If I wanted to I could easily replace refined grains with whole grains often enough to reduce my risk of developing Type 2 Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

6) **How confident are you that you are capable of replacing refined grains with whole grains often enough to reduce your risk of developing Type 2 Diabetes?**

1	2	3	4	5	6	7
Not at all Confident			Moderately Confident			Completely Confident

7) **Do you plan to replace refined grains with whole grains to reduce your risk of Type 2 Diabetes?**

1	2	3	4	5	6	7
Definitely not			Maybe			Definitely

DIETARY FATS

1) **I feel that replacing saturated and trans fats with unsaturated fats would help me to personally reduce my risk of Type 2 Diabetes**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

2) **How effective do you feel replacing saturated and trans fats with unsaturated fats would be for reducing your risk of Type 2 Diabetes**

1	2	3	4	5	6	7
Not at all Effective		Slightly Effective		Moderately Effective		Extremely Effective

3) **I feel that the evidence linking saturated and trans fats to Type 2 Diabetes risk is very strong**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

4) **For me to replace saturated and trans fats with unsaturated fats often enough to reduce my risk of developing Type 2 Diabetes would be:**

1	2	3	4	5	6	7
Extremely Difficult			Moderately Difficult/Easy			Extremely Easy

5) **If I wanted to, I could easily replace saturated and trans fats with unsaturated fats often enough to reduce my risk of developing Type 2 Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

6) **How confident are you that you are capable of replacing saturated and trans fats with unsaturated fats often enough to reduce your risk of developing Type 2 Diabetes?**

1	2	3	4	5	6	7
Not at all Confident			Moderately Confident			Completely Confident

7) **Do you plan to replace saturated and trans fat with unsaturated fat to reduce your risk of Type 2 Diabetes?**

1	2	3	4	5	6	7
Definitely not			Maybe			Definitely

SECTION I: PHYSICAL EXERCISE

1) **During a typical 7-day period (a week), how many times on average do you do the following kinds of exercise for more than 10 minutes during your free-time (write on each line the appropriate number)**

Times Per Week

(a) STENUOUS EXERCISE (HEART BEATS RAPIDLY)
(i.e. running, jogging, cross country skiing, vigorous swimming, vigorous long distance long distance bicycling) _____

(b) MODERATE EXERCISE (NOT EXHAUSTING)
(i.e. fast walking, easy bicycling, easy swimming, popular and folk dancing) _____

(c) MILD EXERCISE (MINIMAL EFFORT)
(i.e. yoga, archery, fishing from river back, bowling, horseshoes, golf, easy walking) _____

2) **During a typical 7 day period (a week), in your leisure-time, how often do you engage in any regular activity long enough to work up a sweat (heart beats rapidly)?**

1. OFTEN	**2. SOMETIMES**	**3. NEVER/RARELY**
○	○	○

3) **I feel that physical exercise would help me to personally reduce my risk of Type 2 Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

4) **How effective do you feel physical exercise would be for reducing your risk of Type 2 Diabetes?**

1	2	3	4	5	6	7
Not at all Effective		Slightly Effective		Moderately Effective		Extremely Effective

5) **I feel that the evidence linking physical exercise to Type 2 Diabetes risk reduction is very strong.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

6) **For me do the types and amount of physical exercise necessary to reduce my risk of developing Type 2 Diabetes would be:**

1	2	3	4	5	6	7
Extremely Difficult			Moderately Difficult/Easy			Extremely Easy

7) **If I wanted to, I could easily do the types and amount of physical exercise necessary to reduce my risk of developing Type 2 Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

8) **How confident are you that you are capable of doing the types and amount of physical exercise to reduce your risk of developing Type 2 Diabetes?**

1	2	3	4	5	6	7
Not at all Confident			Moderately Confident			Completely Confident

8) **Do you plan to start an exercise program to reduce your risk of Type 2 Diabetes?**

1	2	3	4	5	6	7
Definitely not			Maybe			Definitely

BODY WEIGHT

1) **What is your most recent body weight?** _____ lb _____ kg ◯ Don't know

2) **When was the last time you had your body weight taken?** _____

3) **I feel that losing weight or maintaining a healthy weight would help me to personally reduce my risk of Type 2 Diabetes**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

4) **How effective do you feel losing weight or maintaining a healthy weight would be for reducing your risk of Type 2 Diabetes**

1	2	3	4	5	6	7
Not at all Effective		Slightly Effective		Moderately Effective		Extremely Effective

5) **I feel that the evidence linking healthy body weight to Type 2 Diabetes risk reduction is very strong**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

6) **For me, maintaining a healthy body weight or losing the necessary amount of weight to reduce my risk of developing Type 2 Diabetes would be:**

1	2	3	4	5	6	7
Extremely Easy			Moderately Easy/Difficult			Extremely Difficult

7) **If I wanted to, I could easily maintain a healthy body weight or lose the amount of weight necessary to reduce my risk of developing Type 2 Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

8) **How confident are you that you are capable of maintaining a healthy body weight or losing the amount of weight necessary to reduce your risk of developing Type 2 Diabetes?**

1	2	3	4	5	6	7
Not at all Confident			Moderately Confident			Completely Confident

9) **Do you plan to lose at least 5-7% of your body weight to reduce your risk of Type 2 Diabetes?**

1	2	3	4	5	6	7
Definitely not			Maybe			Definitely

SECTION J: NEXT STEPS

1) **I have the information I need to reduce my risk of developing diabetes.**

1	**2**	**3**	**4**	**5**
strongly disagree	disagree	neither agree or disagree	agree	strongly agree

2) **Would you like more information or support to help you and your family prevent diabetes?**

◯ Yes ◯ No → **Go to question 3**

If yes, what type of information or support would you prefer? Please check all that apply.

◯ Another information session
◯ Support groups with other women
◯ Individual advice from a dietitian
◯ E-mail or telephone follow-up
◯ Fitness classes
◯ Childcare
◯ Cooking classes
◯ Family-centered physical activity program

Other, please specify _____

3) **How helpful were the nutrition recommendations you received during the information session you attended?**

1	2	**3**	4	**5**	6	**7**
not helpful		somewhat helpful		moderately helpful		very helpful

4) **How helpful were the physical recommendations you received at during the information session you attended?**

1	2	**3**	4	**5**	6	**7**
not helpful		somewhat helpful		moderately helpful		very helpful

5) **How helpful were the diabetes testing recommendations you received during the information session you attended?**

1	2	**3**	**4**	**5**	6	**7**
not helpful		somewhat helpful		moderately helpful		very helpful

6) **How can this information session be improved?**

_____

_____

_____

_____

7) **Have you been involved with any other healthy eating or physical activity programs since the birth of your child?**

◯ Yes ◯ No

If yes, please specify

◯ Exercise and Pregnancy Lab at the University of Western Ontario

◯ Other (Please specify) _____

Thank you for your time and assistance.
Your answers will help us better meet the needs of women who have had Gestational Diabetes.

Appendix G: Participant Questionnaire #3B

If you agreed to participate in the Families Preventing Diabetes Research Project, please answer the following questions. This individual information is strictly confidential. Only averages from a large group will be reported at the end of data collection.

SECTION A: TYPE 2 DIABETES

1) **On a scale from 0 to 100 percent (%), what do you think your risk (or chance) is of developing Type 2 Diabetes**

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

2) **On a scale from 0 to 100 percent (%), what do you think your infant's risk (or chance) is of developing Type 2 Diabetes during his or her lifetime?**

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

3) **Personally, I feel vulnerable to developing Type 2 Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

4) **I think it is likely that I will develop Type 2 Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

5) **Compared to the average person, I feel that my chance of developing Type 2 Diabetes is:**

1	2	3	4	5	6	7
Much Lower	Lower	Slightly Lower	About the Same	Slightly Higher	Moderately Higher	Much Higher

6) **I feel that it would be very serious for me to develop Type 2 Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

7) **If you developed Type 2 Diabetes, how much would it interfere with you leading a normal life?**

1	2	3	4	5	6	7
Not at all			Moderately			Very Much

8) **The thought of developing Type 2 Diabetes scares me.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

SECTION B: DIABETES TESTING

1) **Have you been tested for diabetes since your most recent pregnancy?**

◯ Yes ◯ No ◯ Don't know

If yes, what was the result? ◯ Diabetes ◯ Prediabetes ◯ Normal ◯ I was not told

2) **Do you plan to be tested for Type 2 Diabetes in the future?**

◯ Yes ◯ No ◯ Undecided

If yes, when do you plan to be tested? (Check all that apply)

◯ within 6 months of my most recent birth
◯ before my next pregnancy
◯ every year
◯ every 2 years
◯ every 5 years
◯ don't know

SECTION C: YOUR NEXT PREGNANCY

1) **Is it possible that you could become pregnant again?**

◯ Yes ◯ Uncertain ◯ No → **Go to Section D (Infant Feeding)** - see below

2) **On a scale from 0 to 100 percent(%), what do you think your risk (or chance) is of developing Gestational diabetes during your next pregnancy?**

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

3) **Personally, I feel vulnerable to developing Gestational Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

4) **I think it is likely that I will develop Gestational Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

5) **Compared to the average person, I feel that my chance of developing Gestational Diabetes is:**

1	2	3	4	5	6	7
Much Lower	Lower	Slightly Lower	About the Same	Slightly Higher	Moderately Higher	Much Higher

6) **I feel that it would be very serious for me to develop Gestational Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

7) **If you developed Gestational Diabetes, how much would it interfere with you leading a normal pregnancy?**

1	2	3	4	5	6	7
Not at all			Moderately			Very Much

8) **The thought of developing Gestational Diabetes scares me.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

9) **If you were to become pregnant again, when would you first request to be tested for Gestational Diabetes?**

◯ Before 13 weeks of pregnancy ◯ 13-18 weeks of pregnancy ◯ 19-23 weeks of pregnancy

◯ 24-28 weeks of pregnancy ◯ After 29 weeks of pregnancy ◯ Don't know

◯ I would not ask to be tested

SECTION D: INFANT FEEDING

1) **Are you currently breastfeeding?** ◯ Yes ◯ No

2) **Currently, is your infant consuming any infant formula?** ◯ Yes ◯ No

3) **Is your baby consuming any other foods or drinks, other than breast milk or formula?**

◯ Yes ◯ No

4) **When do you plan to introduce foods other than breast milk, infant formula or water to your infant?**

◯ 1 month of age ◯ 4 months of age ◯ 7 months of age

◯ 2 months of age ◯ 5 months of age ◯ 8 months of age

◯ 3 months of age ◯ 6 months of age ◯ Don't know

5) **If you became pregnant again, how long would you exclusively breastfeed your infant ?**

◯ I do not plan to breast feed	◯ 3 months	◯ 6 months
◯ 1 month	◯ 4 months	◯ 7 months
◯ 2 months	◯ 5 months	◯ Don't know

6) **Breastfeeding your infant may:** (Check all that apply)

- ◯ Reduce your risk for developing Type 2 Diabetes
- ◯ Reduce your risk of developing Gestational Diabetes
- ◯ Reduce your infant's risk of developing Type 2 Diabetes
- ◯ Don't know

SECTION E: VEGETABLES AND FRUIT

1) **Did you eat or drink fruit or fruit juice yesterday?** ◯ Yes ◯ No → **Go to question 2**

If yes, please list the fruit or fruit juice you ate or drank yesterday and the amount you ate or drank.

Description	**Amount** (e.g. 1 cup (250 mL/8 oz), 1 medium)
Example: frozen blueberries	*Example: ¼ cup*

2) **Did you eat or drink vegetables or vegetable juice yesterday?**
◯ Yes ◯ No → **Go to question 3**

If yes, please list the vegetable(s) or vegetable juice you ate or drank yesterday and the amount you ate or drank.

Description	**Amount** (e.g. 1 cup (250 mL/8 oz), 1 medium)
Example: broccoli, steamed	*Example: ½ cup*

3) **I feel that consuming vegetables and fruit, including dark green leafy vegetables, would help me to personally reduce my risk of Type 2 Diabetes?**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

4) **How effective do you feel consuming vegetables and fruit , including dark green leafy vegetables, would be for reducing your risk of Type 2 Diabetes?**

1	2	3	4	5	6	7
Not at all Effective		Slightly Effective		Moderately Effective		Extremely Effective

5) **I feel that the evidence linking vegetable and fruit consumption, including dark green leafy vegetables, to Type 2 Diabetes risk reduction is very strong.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

6) **For me to consume the types and amounts of vegetables and fruit necessary to reduce my risk of developing Type 2 Diabetes would be:**

1	2	3	4	5	6	7
Extremely Difficult			Moderately Difficult/Easy			Extremely Easy

7) **If I wanted to I could easily consume the types and amounts of vegetables and fruit necessary to reduce my risk of developing Type 2 Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

8) **How confident are you that you are capable of consuming the recommended types and amounts of vegetables and fruit necessary to reduce your risk of developing Type 2 Diabetes?**

1	2	3	4	5	6	7
Not at all Confident			Moderately Confident			Completely Confident

9) **Do you plan to consume vegetables and fruit, including dark green leafy vegetables, to reduce your risk of Type 2 Diabetes?**

1	2	3	4	5	6	7
Definitely not			Maybe			Definitely

SECTION F: SUGAR SWEETENED BEVERAGES

"Sugar Sweetened Beverages" include regular pop, fruit drinks, sports drinks, hot chocolate, sugar sweetened energy drinks and any other beverage that contains added sugars

2) **How many cups of sugar sweetened beverages do you drink on a typical day? (1 cup=250 mL)**

◯ Less than ½ cup	◯ 2 cups	◯ 5 cups
◯ ½ cup	◯ 3 cups	◯ 6 cups
◯ 1 cup	◯ 4 cups	◯ More than 6 cups

3) **I feel that avoiding sugar sweetened beverages would help me to personally reduce my risk of Type 2 Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

4) **How effective do you feel avoiding sugar sweetened beverages would be for reducing your risk of Type 2 Diabetes ?**

1	2	3	4	5	6	7
Not at all Effective		Slightly Effective		Moderately Effective		Extremely Effective

5) **I feel that the evidence linking sugar sweetened beverages consumption to Type 2 Diabetes risk is very strong.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

6) **For me to reduce my sugar sweetened beverages intake to the amount necessary to reduce my risk of developing Type 2 Diabetes would be:**

1	2	3	4	5	6	7
Extremely Difficult			Moderately Difficult/Easy			Extremely Easy

7) **If I wanted to, I could easily reduce my sugar sweetened beverages intake to the amount necessary to reduce my risk of developing Type 2 Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

8) **How confident are you that you are capable of reducing your sugar sweetened beverages intake to the amount necessary to reduce your risk of developing Type 2 Diabetes?**

1	2	3	4	5	6	7
Not at all Confident			Moderately Confident			Completely Confident

9) **Do you plan to avoid sugar sweetened beverage to reduce your risk of Type 2 Diabetes?**

1	2	3	4	5	6	7
Definitely not			Maybe			Definitely

SECTION G: BREAKFAST

A **"Healthy Breakfast"** is a meal consisting of high fibre, lower fat foods that is eaten within 2 hours of waking up.

1) **How many days did you eat a healthy breakfast during the LAST 7 DAYS?**

◯ none	◯ 2 days	◯ 4 days	◯ 6 days
◯ 1 day	◯ 3 days	◯ 5 days	◯ 7 days

2) **I feel that consuming a healthy breakfast would help me to personally reduce my risk of Type 2 Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

3) **How effective do you feel consuming a healthy breakfast would be for reducing your risk of Type 2 Diabetes**

1	2	3	4	5	6	7
Not at all Effective		Slightly Effective		Moderately Effective		Extremely Effective

4) **I feel that the evidence linking the consumption of a healthy breakfast to Type 2 Diabetes risk reduction is very strong**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

5) **For me to consume a healthy breakfast often enough to reduce my risk of developing Type 2 Diabetes would be:**

1	2	3	4	5	6	7
Extremely Difficult			Moderately Difficult/Easy			Extremely Easy

6) **If I wanted to, I could easily consume a healthy breakfast often enough to reduce my risk of developing Type 2 Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

7) **How confident are you that you are capable of consuming a healthy breakfast often enough to reduce your risk of developing Type 2 Diabetes?**

1	2	3	4	5	6	7
Not at all Confident			Moderately Confident			Completely Confident

8) **Do you plan to consume a healthy breakfast daily to reduce your risk of Type 2 Diabetes?**

1	2	3	4	5	6	7
Definitely not			Maybe			Definitely

SECTION H: LABEL READING AND FOOD SELECTION

1) **How often do you look at the nutrition label on products before you buy them?**

◯ Always ◯ Most of the time ◯ Half of the time ◯ Sometimes ◯ Never

2) **If you look at nutrition labels, what are you looking for?** Please check all that apply.

◯ Total carbohydrates
◯ Sugar
◯ Fibre
◯ Trans Fat
◯ Saturated fat
◯ Total fat
◯ Protein
◯ Ingredients list
◯ Other (please specify) _____

3) **How often do you choose the healthier product based on this information?**

◯ Always ◯ Most of the time ◯ Half of the time ◯ Sometimes ◯ Never

GRAINS

1) **I feel that replacing refined grains with whole grains would help me to personally reduce my risk of Type 2 Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

2) **How effective do you feel replacing refined grains with whole grains would be for reducing your risk of Type 2 Diabetes?**

1	2	3	4	5	6	7
Not at all Effective		Slightly Effective		Moderately Effective		Extremely Effective

3) **I feel that the evidence linking whole grains to Type 2 Diabetes risk reduction is very strong.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

4) **For me to replace refined grains with whole grains often enough to reduce my risk of developing Type 2 Diabetes would be:**

1	2	3	4	5	6	7
Extremely Difficult			Moderately Difficult/Easy			Extremely Easy

5) **If I wanted to, I could easily replace refined grains with whole grains often enough to reduce my risk of developing Type 2 Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

6) **How confident are you that you are capable of replacing refined grains with whole grains often enough to reduce your risk of developing Type 2 Diabetes?**

1	2	3	4	5	6	7
Not at all Confident			Moderately Confident			Completely Confident

7) **Do you plan to replace refined grains with whole grains to reduce your risk of Type 2 Diabetes?**

1	2	3	4	5	6	7
Definitely not			Maybe			Definitely

DIETARY FATS

1) **I feel that replacing saturated and trans fats with unsaturated fats would help me to personally reduce my risk of Type 2 Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

2) **How effective do you feel replacing saturated and trans fats with unsaturated fats would be for reducing your risk of Type 2 Diabetes?**

1	2	3	4	5	6	7
Not at all Effective		Slightly Effective		Moderately Effective		Extremely Effective

3) **I feel that the evidence linking saturated and trans fats to Type 2 Diabetes risk is very strong.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

4) **For me to replace saturated and trans fats with unsaturated fats often enough to reduce my risk of developing Type 2 Diabetes would be:**

1	2	3	4	5	6	7
Extremely Difficult			Moderately Difficult/Easy			Extremely Easy

5) **If I wanted to I could easily replace saturated and trans fats with unsaturated fats often enough to reduce my risk of developing Type 2 Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

6) **How confident are you that you are capable of replacing saturated and trans fats with unsaturated fats often enough to reduce your risk of developing Type 2 Diabetes?**

1	2	3	4	5	6	7
Not at all Confident			Moderately Confident			Completely Confident

7) **Do you plan to replace saturated and trans fat with unsaturated fat to reduce your risk of Type 2 Diabetes?**

1	2	3	4	5	6	7
Definitely not			Maybe			Definitely

SECTION I: PHYSICAL EXERCISE

1) **During a typical 7-day period (a week), how many times on average do you do the following kinds of exercise for more than 10 minutes during your free-time (write on each line the appropriate number)**

Times Per Week

(a) STENUOUS EXERCISE (HEART BEATS RAPIDLY)
(i.e. running, jogging, cross country skiing, vigorous swimming, vigorous long distance long distance bicycling) _____

(b) MODERATE EXERCISE (NOT EXHAUSTING)
(i.e. fast walking, easy bicycling, easy swimming, popular and folk dancing) _____

(c) MILD EXERCISE (MINIMAL EFFORT)
(i.e. yoga, archery, fishing from river back, bowling, horseshoes, golf, easy walking) _____

2) **During a typical 7 day period (a week), in your leisure-time, how often do you engage in any regular activity long enough to work up a sweat (heart beats rapidly)?**

1. OFTEN	**2. SOMETIMES**	**3. NEVER/RARELY**
○	○	○

3) **I feel that physical exercise would help me to personally reduce my risk of Type 2 Diabetes**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

4) **How effective do you feel physical exercise would be for reducing your risk of Type 2 Diabetes**

1	2	3	4	5	6	7
Not at all Effective		Slightly Effective		Moderately Effective		Extremely Effective

5) **I feel that the evidence linking physical exercise to Type 2 Diabetes risk reduction is very strong**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

6) **For me to do the types and amount of physical exercise necessary to reduce my risk of developing Type 2 Diabetes would be:**

1	2	3	4	5	6	7
Extremely Difficult			Moderately Difficult/Easy			Extremely Easy

7) **If I wanted to, I could easily do the types and amount of physical exercise necessary to reduce my risk of developing Type 2 Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

8) **How confident are you that you are capable of doing the types and amount of physical exercise to reduce your risk of developing Type 2 Diabetes?**

1	2	3	4	5	6	7
Not at all Confident			Moderately Confident			Completely Confident

9) **Do you plan to start an exercise program to reduce your risk of Type 2 Diabetes?**

1	2	3	4	5	6	7
Definitely not			Maybe			Definitely

BODY WEIGHT

1) **What is your most recent body weight?** _____ lb _____ kg ◯ Don't know

2) **When was the last time you had your body weight taken?** _____

3) **I feel that losing weight or maintaining a healthy weight would help me to personally reduce my risk of Type 2 Diabetes**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

4) **How effective do you feel losing weight or maintaining a healthy weight would be for reducing your risk of Type 2 Diabetes**

1	2	3	4	5	6	7
Not at all Effective		Slightly Effective		Moderately Effective		Extremely Effective

5) **I feel that the evidence linking healthy body weight to Type 2 Diabetes risk reduction is very strong**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

6) **For me maintaining a healthy body weight or losing the necessary amount of weight to reduce my risk of developing Type 2 Diabetes would be:**

1	2	3	4	5	6	7
Extremely Easy			Moderately Easy/Difficult			Extremely Difficult

7) **If I wanted to, I could easily maintain a healthy body weight or lose the amount of weight necessary to reduce my risk of developing Type 2 Diabetes.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree		Slightly Agree	Moderately Agree	Strongly Agree

8) **How confident are you that you are capable of maintaining a healthy body weight or losing the amount of weight necessary to reduce your risk of developing Type 2 Diabetes?**

1	2	3	4	5	6	7
Not at all Confident			Moderately Confident			Completely Confident

9) **Do you plan to lose at least 5-7% of your body weight to reduce your risk of Type 2 Diabetes?**

1	2	3	4	5	6	7
Definitely not			Maybe			Definitely

SECTION J: NEXT STEPS

8) **Why did you choose not to attend the information session?**

9) **Have you been involved with any other healthy eating or physical activity programs since the birth of your child?**

○ Yes ○ No

If yes, please specify

○ Exercise and Pregnancy Lab at the University of Western Ontario

○ Other (Please specify) _____

Thank you for your time and assistance.
Your answers will help us better meet the needs of women who have had Gestational Diabetes.

Curriculum Vitae

Name: Jennifer Jacob (nee MacLellan) RD, CDE

Post-secondary Education and Degrees:
The University of Western Ontario, Brescia University College
London, Ontario, Canada
2002-2007 HBSc Human Ecology (Foods and Nutrition)

London Health Sciences Centre
London, Ontario, Canada
2007-2008 Comprehensive Dietetic Internship

Related Work Experience
Public Health Nutritionist - Chronic Disease Prevention
Windsor-Essex County Health Unit
2012-present

Registered Dietitian - Women's Health
St. Joseph's Health Care
2008-2011

Publications:

McLaren J., MacLellan J., McManus R., Dworatzek PDN., Giroux I. (2012, October). Perception of Pregnancy Nutrition Recommendations in Women with Gestational Diabetes. Poster presented at the Canadian Diabetes Association Professional Conference and Annual Meetings in Vancouver, BC

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McManus R., Giroux I., Zhou A., McLaren J., MacLellan J. (2012). Characteristics of women with recent Gestational Diabetes Mellitus attending a postpartum diabetes prevention seminar. *Canadian Journal of Diabetes*, 36 (2), 68-70.

MacLellan J., Giroux I., Shier A., McManus R., Dworatzek PDN. (2011, June). Understanding intention to engage in diabetes prevention behaviours post-Gestational Diabetes. Poster presented at the annual Dietitians of Canada Conference in Edmonton, AB

MacLellan J., Watt A., McManus R., Giroux I. (2010, May). The relationship between risk factors, risk awareness and diabetes screening rates among women with Gestational Diabetes living in London and Perth County, Ontario. Poster presented at the annual Dietitians of Canada Conference in Montreal, QC